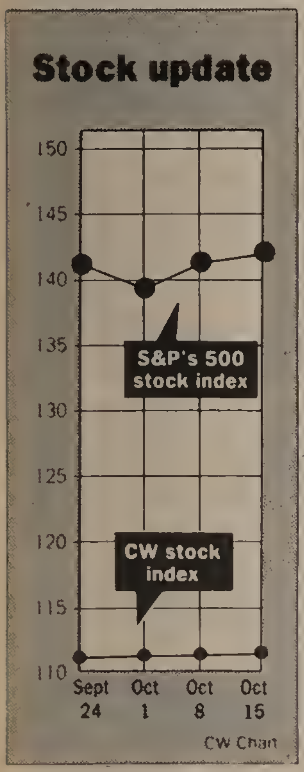
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2/COPY; $44/YEAR

OCTOBER 20, 1986

VOL. XX, NO. 42



Stock charts in full, page 141

CW's Annual Hardware Roundup:
Micros/**41**

In Depth
Gerald Weinberg on becoming a technical leader/**65**

Memorex on auction block

Sperry merger seen trigger; Burroughs mum on sale

By Donna Raimondi

In the midst of digesting the largest computer industry acquisition ever, Burroughs Corp. has quietly placed Memorex Corp., its peripherals subsidiary, up for sale, according to a Memorex executive.

The disclosure last week by Memorex Marketing Vice-President Bill Etheredge apparently caught Burroughs by surprise. After initially saying a response was being prepared, Burroughs spokesmen instead offered a terse "no comment."

Burroughs acquired Memorex, a supplier of IBM plug-compatible and other peripheral products, in 1982. This year, Burroughs also won a lengthy campaign to convince Sperry Corp. to merge the two mainframe vendors in a $4.8 billion transaction.

Some analysts say offers of $500 million to $800 million have been made by major vendors such as Fujitsu America Ltd., Amdahl Corp., Hitachi America Ltd. and Telex Computer Products, Inc., but each of those rumored suitors denied plans to purchase Memorex. Analysts say that at least one and possibly two suitors are waiting for decisions.

"The stories about who will buy Memorex are strictly rumor," Etheredge said. But Michael Blumenthal, president and CEO of the merged companies, needs to raise cash and will entertain the notion of selling any piece of the business for the right price, Etheredge added. Blumenthal's June statement to that effect has stirred buyer interest in various pieces of the company, including Memorex, Etheredge said. Although Burroughs does not reveal Memorex's financial details, it is believed the subsidiary has become profitable only in the past year. One analyst said Memorex generated $1 billion in revenue for 1986.

"If Memorex gets sold, it will certainly happen before December to reflect on the profit-and-loss statement," said industry analyst Louise Biggs of Dataquest, Inc. in San Jose, Calif. Memorex is divided into several sections, some of which are highly desirable, she said. "I don't antici-

See **MEMOREX** page 4

Great Communicator: Users see 9370 as bridge to mainframe world

By Elisabeth Horwitt

With the recent addition of the 9370 Information System to its processor line, IBM has revolutionized the way 370 hosts communicate with each other and the outside world.

Targeting commercial and technical distributed processing users who already have installed bases of other vendors' computers, IBM has for the first time made communications with non-IBM products an intrinsic element of the 370/Systems Network Architecture environment.

Ground-breaking capabilities offered by the 9370 include direct board-level links to both 802.3 Ethernet and IBM Token-Ring networks; a software facility that enables users to transparently access SQL data bases on up to eight 9370 hosts as if they resided on one system; and communications with IBM and non-IBM systems supporting the Transmission Control Protocol/Internet Protocol, over either Ethernet or the Token-Ring network.

"IBM has finally brought the 370 architecture into the office," says Stephen Sperandio, director of financial information services at Blue Cross/Blue Shield of Massachusetts.

"This is probably their most significant announcement in a long time," Sperandio says.

Unlike the System/36, which "forces companies that already have 370 hosts to cope with an entirely different architecture," the 9370 enables companies to move software applications around

See **9370** page 8

TOP OF THE NEWS

E. F. Hutton's contract for 10,000 PCs is awarded to NCR. **Page 13.**

■

RCA pulls the plug on its last connection to the glory days of mainframe manufacturing. **Page 2.**

■

The selective "Enterprise" IBM discount maintenance program ends, replaced with a broader plan for corporatewide service. **Page 6.**

■

Wang enters the laptop scrimmage with a Japanese-built model and built-in printer. **Page 10.**

■

Tape cache enables a Texas firm to delay the expense of tape cartridges for two years. **Page 31.**

■

Lotus today is set to unveil its Manuscript word processing package for the technical market, but some sources pre-

See **NEWS** page 4

CW PROFILE

MBA's recipe for success has dough rising at Pillsbury MIS

By David A. Ludlum

Squeezing in a meeting during breakfast in his hotel suite, genial yet intent in sizing up the focus of an interview, John Hammitt exhibits the businesslike demeanor suited to the concept of chief information officer.

Indeed Hammitt, who started his career as a chemical engineer and who holds an MBA from the University of Chicago, describes his role at Pillsbury Co. as guiding information systems strategy and investments, with no day-to-day responsibilities.

John Hammitt

But, unlike some others in such a position, Hammitt eschews the title of chief information officer, taking instead vice-president for information management. In fact, he thinks the title of CIO is a little presumptuous.

"I think we do ourselves

See **DOUGH** page 6

DEC soars, IBM struggles

Armonk shake-up follows financials

By Clinton Wilder

Third-quarter financial results announced last week by IBM and Digital Equipment Corp. dramatically underscores the contrasting performances of the industry's two leading players in 1986.

IBM, in its largest year-to-year quarterly profit drop in at least five years, said earnings fell 27% on a tiny 1.8% gain in revenue. DEC, continuing its meteoric performance in a sluggish industry, reported that profits soared 153% on a 26% rise in sales.

Separately, IBM Friday announced a major management shake-up as former Chief Financial Officer Allen J. Krowe took over responsibility for two key product units and Rolm Corp. "Krowe now has the whole bag where IBM is most concerned — its critical market areas for the future," said International Data Corp. analyst Jack Hart, a 20-year IBM veteran.

IBM Chairman John F. Akers continued to cite weak macroeconomic factors in the U.S. and abroad. But analysts believe that changing growth patterns in the computer industry play to IBM's mid-range systems weaknesses and DEC's strengths.

"DEC has all of its energies

See **DEC** page 12

NEWSPAPER

Unplugging Univac cuts last RCA ties to mainframe era

By Eddy Goldberg

RCA Corp. recently shut down its last Univac 90/80, the final link to its history as a computer manufacturer that ended abruptly 15 years ago on "Black Friday" in September 1971.

"It's the end of an era," an RCA corporate data center employee said. "The weekend of Sept. 27th was the last time that any major processing was done here on the 90/80. Then we let it spin its cycles out for a week and shut it down Oct. 4th." The cables have been pulled, and the box was scheduled to be moved to a warehouse last Friday, the source added.

Back in 1970, RCA President and Chief Executive Officer Robert W. Sarnoff stated, "We are determined to attain an industry rank second only to IBM in this country. In order to accomplish this goal, RCA is prepared to commit whatever resources are necessary."

One year later, Sarnoff pulled the plug on RCA's 15-plus years in the computer business. He said the $500 million needed to keep the business alive for five more years would not be forthcoming. That day became known as Black Friday for thousands of idled RCA employees. Sperry Rand Corp.'s Univac division quickly took over RCA's customer base. RCA, no longer a vendor, became a user of its own computers, which evolved into Univac products.

In 1971, as a user of RCA equipment, Black Friday was "anxiety city for me," the RCA employee said. His fears were eased a few months later when Sperry's Univac division took over, providing manufacturing and maintenance for the computers and jobs for many of the RCA employees.

He said the chief engineer for the RCA 7 virtual processor, a major part of RCA's mainframe plans, was hired by Univac, where he developed a CPU for the Univac 90/80. "It was effectively an extension of the RCA 7, bigger and better," said the employee, who was hired by Sperry in the early 1970s where he worked on 90/80 software. He said Sperry also adapted RCA's VMOS, calling it VS/9.

Some years later, when he went to work for RCA, there were two Univac 90/80 systems in its corporate computer center. RCA also had a couple of IBM 370/168 systems at the time, and was in the beginning stages of a conversion plan to IBM equipment.

He said the 90/80 was a good system. "It ran well, but we outgrew it." Although Univac's service and support was very good, he said IBM's was even better. The greater availability of software for the IBM systems was an additional factor in RCA's decision to convert to IBM. "It was in May 1980 that we got rid of the last RCA Spectra 70 processor," another RCA employee said.

There are some strange twists to the story of what might have been for RCA, one of the "Seven Dwarfs," a group that also included the five BUNCH companies and General Electric Co.

GE sold its computer business to Honeywell, Inc. in 1970, a year before RCA decided to pull out. In 1986, GE, now Honeywell's biggest computer customer, bought RCA. GE, with its Honeywell and IBM systems, is in the process of merging with RCA and its IBM systems, just as RCA puts its last Univac 90/80 to rest. RCA, which declared in 1970 it would be No. 2 to IBM, just cut the final cord to its past as a mainframe manufacturer.

Lotus to download from MVS

By David Bright

CAMBRIDGE, Mass. — Lotus Development Corp. last week said that it will be replacing its VM electronic software distribution system with a commercial offering running under both VM and MVS.

Lotus had announced electronic distribution in August as part of its Multi-Value Plan providing service and support to large companies. With the system, microcomputer software can be downloaded from IBM 370 mainframes to personal computers with IBM 3270 terminal emulation. Tangram Systems Corp., based in Cary, N.C., is developing the system with Lotus.

"The primary benefit of the system is found in reduced staff time and expense in distributing software product upgrades, drive changes and templates to large numbers of users," said Alexander Crosett, manager of Lotus's Information Center Group. The system will initially work with Lotus 1-2-3 and Symphony, but plans call for all Lotus software to be included.

Lotus refuses to specify the minimum number of units needed to qualify for the plan. However, Lotus's Special Bids volume purchase plan requires a 500-unit minimum. Pricing and the required volume will be disclosed when the product begins shipping, a Lotus spokeswoman said. Each customer's installed base of Lotus software will count toward the minimum number, and software pricing will remain on a per-copy basis, she added.

In addition to Lotus software and a company's internal templates and applications, the distribution system can also be used to download other vendors' unprotected software. Beta testing for the MVS system will begin by year end, and the VM replacement will follow in the first half of 1987.

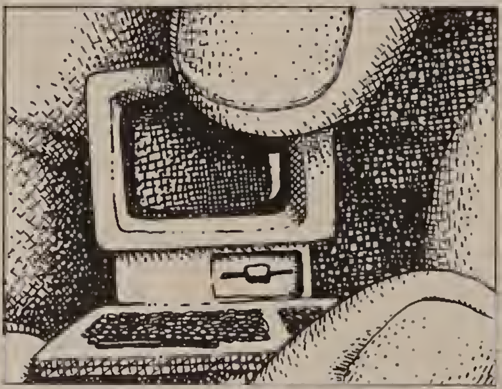
The original electronic distribution plan was developed for use by Exxon Corp., but other customers soon requested a similar program, the spokeswoman said.

The system can support both VM and MVS because it is VTAM-based, rather than being tied to an operating system-specific teleprocessing monitor, said Art Ingram, Tangram vice-president of marketing and sales. The system is built around Tangram's Arbiter micro-to-mainframe cooperative processing system.

In this issue

NEWS

Memorex unveils array of plug-compatible products/ **5**
IBM discount maintenance no longer exclusive to top customers/ **6**
Support shaky for Intel 80386 board/ **8**
Managers hunt for multivendor systems links/ **10**
Delayed Wang Laptop released/ **10**
NCR scores $20M PC AT-compatible deal with E. F. Hutton/ **13**



Page 41

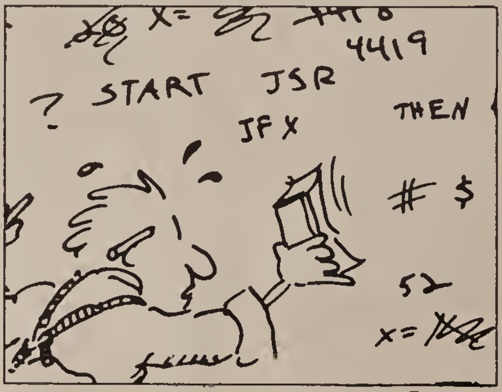
Cooperative processing takes first steps/ **14**
Javelin dramatically cuts software prices/ **15**

SOFTWARE & SERVICES

VM tools, high-tech VM/SP debut from IBM/ **19**
On-Line Software reasserts itself in E-mail market/ **19**

COMMUNICATIONS

Link allows non-SNA access to SNA/ **27**
Asher claims to offer first link from IBM PC LAN to System/36, 38/ **27**
VMX voice messaging system makes its debut/ **27**



Page 65

SYSTEMS & PERIPHERALS

DEC boosts 8200, 8300 supermini support/ **31**
NCR 32-bit supermicro supports up to 16 users/ **31**
Texas firm reaps benefits from data compacting device/ **31**

MICROCOMPUTERS

Foray into AI yields upgrade on Borland Turbo Prolog/ **35**
Polytron attempts IBM PC speedup with software/ **35**
Language links, high-speed tools out from Microsoft/ **35**

MANAGEMENT

Videotex becomes a corporate tool/ **89**

COMPUTER INDUSTRY

Interview: The Dana Group's Michels on venture capital and the Convergent exodus/ **115**
Third-quarter results promising for workstation vendors/ **142**
Chip makers Intel, AMD continue to face heavy losses/ **142**
NAS-Hitachi agreement unchanged by U.S. manufacturing, officials claim/ **142**

HARDWARE ROUNDUP

Despite competition, the microcomputer world still revolves around IBM. But challengers are fighting back with price/performance ratios. This week's Hardware Roundup looks at microcomputers. By David Bright/ **41**

IN DEPTH

Living in the shadow: Cobol 85 offers enhancements sought by mainframe users. Yet these same users favor more conventional tools. By Lemuel Skidmore/ **57**
Self-blindness, the 'No Problem Syndrome' and other obstacles to becoming a technical leader. By Gerald Weinberg/ **65**
Still No. 3, but trying harder: In 1981, Chrysler invested millions in CAD/CAE systems and high-speed networking. Slowly but surely, that investment is paying off. By Jean Bozman/ **77**

OPINION & ANALYSIS

Mallach warns against software gizmos, vaporware/ **17**
Thimbault suggests alternative software support/ **19**
Horwitt on AT&T as 'just one more vendor'/ **27**
Connolly considers issues piqued by 9370 arrival/ **31**
Zachmann critiques Learning DOS/ **35**
Klein analyzes the BUNCH user's dilemma/ **89**
Djurdjevic on IBM's sugar and carrot approach to XA Express marketing/ **142**

DEPARTMENTS

Page 16

World Digest/ 15
Editorial/ 16
Calendar/ 92
New Products/ 95

PAGE 17 ILLUSTRATION BY ALAN WITSCHONKE

TURBO

Why are SYBACK & SyncSort CMS the fastest things on no wheels?

(More technology in the tank!)

Call (201) 930-9700.

Arrange a test drive.

You say you've always had very simple tastes? All you ever wanted was the best?

Well, step into our showroom and kick a few tires! We'll show you two programs that are the Ferrari and Lamborghini of VM programs.

- **SYBACK – the world's fastest and most maneuverable backup, restore and copying program;**
- **Syncsort CMS – the world's fastest and most maneuverable VM/CMS sort program.**

What makes 'em so special? Well . . .

(1) TURBO PERFORMANCE: Have you ever stepped down on the gas in a dangerous driving situation and discovered . . . nothing? Well, that'll never happen to you with these two vehicles.

Both are equipped with our special brand of "software turbocharging." We call it FBT, which stands for Fluid Buffering Technique. Our competitors call it something else.

We discovered FBT one dark and rainy night when we were trying to find a way to speed up the movement of data in sort programs. After crying "Eureka," we applied it to our OS and DOS sort programs. The results were . . . wow!

Now we've carried that bright idea over into VM dump-restores and sort programs. And the results are still wow! Compared to any other backup or sort program clogging the nation's VM thruways today, SYBACK and SyncSort CMS will save you up to:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

So who needs all that speed? You do. If you want to optimize your VM operations, stay out of needless DP traffic jams, and make the boss happy with your throughput.

Here's what happened to one large government agency: Their backup operations used to require a full 24 hours to complete. Then they installed SYBACK. Now their backup takes — are you ready? — one-half hour!

(2) EASY HANDLING: SYBACK and SyncSort CMS are among the most flexible, user-friendly programs ever produced by anybody anywhere. That's one reason programmers love 'em. And where does it say that backup and sort operations have to be hard to be good?

(3) "MISTER SOFTWRENCH" SERVICE: We've got the best pit crew in the business. More than 85% of all customer requests are resolved within 24 hours.

If you'd like to put a little high technology in your VM tank, give us a call. We might even take your used VM dump-restore or sort program as a trade-in!

syncsort
INC.

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675

TOP OF THE NEWS

NEWS from page 1

dict that the flexible, full-featured program will be popular for general use as well. The $495 package was built to support the new Hercules Graphics Card Plus, although the card is not required.

■

On Oct. 27, Ashton-Tate is expected to announce Rapid File, formerly code-named Black Gold, a file management system aimed at Intel 8086/8088-based personal computers. Rapid File can import data from Dbase III with a simple keystroke combination, but it reportedly does not use the same file format as Dbase. According to sources close to Ashton-Tate, the product was delayed because of problems in determining an appropriate interface.

■

Texas Instruments, which earlier this year introduced its Business System 1000 series of superminicomputers, is scheduled tomorrow to add several models to that series, which has been renamed the System 1000. The additions include a low-end model in the System 1500 family that was announced in March and the new System 1100 family. The Unix-based system now will support two to 24 users in the System 1100 line and 30 to 128 users in the System 1500 family, according to TI officials.

■

A more sophisticated release of the end-user version of Software AG of North America's Natural, a fourth-generation language, is coming in December. Version 2 of Super Natural will add data base and prototyping capabilities to what has been a basic query and reporting tool, according to officials involved in the project.

■

In a development that could signal a change in the ranking of the top microcomputer software firms, Lotus announced first-quarter sales of $65,560,000, up 32% from the previous year's quarter, with net income of $9,528,000, an increase of 50% from the previous year's quarter. Lotus rival Microsoft recently estimated first-quarter sales of $66 million, with net income of $15 million.

Memorex on the auction block

From page 1

pate that the whole company would be sold, but their international unit has always been very strong. It accounts for half their business, and it would be a dynamite buy for anybody looking for European penetration," she added.

David Vellante, storage analyst at International Data Corp. in Framingham, Mass., however, disagreed that the company will be split along European and North American lines. "If there is a split, it would be to separate the storage part of the business from the terminals side, but given the $500 million to $800 million price tag we hear about, it seems like that would be for the whole company."

While Memorex employees heard that Blumenthal would have made all decisions affecting parts of the companies by mid-October, Etheredge said, the decisions affecting Memorex have been put off until the end of the year. "By then, we should know what the name of the combined [Burroughs and Sperry] companies is and what the disposition of parts of the company, including Memorex, are." At least five task force groups, composed of Burroughs, Sperry and Memorex leaders, are meeting to iron out strategies, Etheredge said.

The Sperry/Memorex workstation collaboration introduced today (see related story page 5) illustrates the apparent synergy between companies that Blumenthal talked about as one of the reasons for the Burroughs/Sperry merger, Etheredge said. Shortly after the merger, Burroughs strongly urged Memorex to scrap a year-old, in-house development project for a 3270-compatible intelligent workstation and instead use Sperry's PC/IT and PC/Micro IT as the basis for the product, he added.

By the end of June — the month in which Burroughs and Sperry decided to merge — Burroughs had decided that Memorex was a logical distribution system for the Sperry product, Etheredge said. "So we slowed our development effort, saw that the Sperry engine was as good as or better than ours, and we used it."

But the prospect of Sperry using Memorex products in its own computer systems is dim, Vellante said. "Memorex will have to compete for Sperry's business. Amperif is making a solid-state device for Sperry that the company is very happy with, and Sperry signed an agreement with Hitachi for disk drives and optical disk drives." Sperry spokesmen were not available for comment.

Meanwhile, Memorex is filling out its IBM plug-compatible peripherals line, Etheredge said. It has caught up with the hole in its large-system storage products with today's announcement of its double-density IBM 3380-type disk drives, and by the summer of 1987 it expects to show a tape cartridge device with an automatic loading device to compete with IBM's popular 3480 product, he said.

Although Memorex is on the selling block, that condition should not affect its customers, Vellante said. "If someone is willing to pay between $500 and $800 million, that's good news," he said. Burroughs accounts for 30% of Memorex' spindle (disk storage) business, and now that Memorex is up to speed technologically, Burroughs would not want to lose that relationship, he added.

AT&T profits soar, for now

By Clinton Wilder

NEW YORK — AT&T last week reported a 41% third-quarter earnings increase, mainly because of one-time gains unrelated to operations. But the telecommunications giant warned that it will take a substantial charge in the fourth quarter because of upcoming employment reduction expenses.

AT&T has offered severance packages to mid-level management employees earning between $30,000 and $90,000 per year. AT&T has not officially announced the number of jobs it is seeking to cut, but analysts believe the number is at least 25,000.

AT&T reported earnings of $533 million, or 48 cents per share, compared with $378 million, or 33 cents per share, a year earlier. But a net total of $157 million, or 14 cents of the recent quarterly earnings, came from extraordinary gains including a reduction in pension expense. Earnings from operations were slightly below 1985 levels.

Revenue also fell slightly, by 2.7%, to $8.43 billion for the quarter.

The company took a one-time charge of $27 million, or 3 cents per share, attributed to work force reductions already identified and consolidation of some facilities.

The company said product sales fell 12.6% from year-earlier levels, reflecting "industrywide soft market conditions and competitive pressures." But revenue from services rose 7.2%, chiefly from increased telephone-calling volume producing greater long distance revenue.

Essentially confirming reports that AT&T is retrenching in the computer industry, Olson said the company's new strategy is to focus on strengthening AT&T's core businesses, develop new data networking capabilities and improve its international business.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), July (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Copyright 1986 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 544-3712 or (215) 768-0388 in Pennsylvania.

Subscriber rates: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year. all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

ABC ABP

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

COMPUTERWORLD

Editor in Chief
Bill Laberis

Executive Editor
Sharon Frederick

News Director
Peter Bartolik

Senior Editors
James Connolly, Systems
Clinton Wilder, Industry
Elisabeth Horwitt, Communications
Charles Babcock, Software
David Ludlum, Management
Douglas Barney, Microcomputers

Senior Writers
Donna Raimondi, Rosemary Hamilton
Eddy Goldberg, Stanley Gibson
David Bright, Ninamary Buba Maginnis

New Products Editor
Suzanne Weixel

Features Director
George Harrar

Senior Editors
Janet Fiderio
Glenn Rifkin
Barbara Wierzbicki

Associate Editor
Amy Sommerfeld Fiore

Assistant Editors
Deborah Fickling, Kelly Shea

Senior Writer
Michael L. Sullivan-Trainor

Managing Editor
Donovan White

Chief Copy Editor
Charlotte Ziems Donaldson

Assistant Chief Copy Editor
Patricia Heal Erickson

Copy Editors
Susan Miller, Steven M. Ulfelder
David W. Bromley, Mary Grover
Nicolene Hengen, James Daly, Martha E. Ruch

Design Editor
Marjorie Magowan

Graphics Editor
Mitchell J. Hayes

Graphic Designer
P. Charles Ladouceur

Graphics Assistant
Jeff Babineau

Assistant to the Editor in Chief
Parth Domke

Editorial Assistants
Patricia Faherty, Christie Sears
Linda Gorgone, Bonnie MacKeil

Rights and Permissions Manager
Nancy Shannon

News Bureaus

Mid-Atlantic
201/967-1350

Alan Alper, Correspondent

Washington, D.C.
202/347-6718

Mitch Betts, Correspondent

Southeast
404/394-0758

James A. Martin, Correspondent

West Coast
415/424-8844

Jeffry Beeler, Chief
Peggy Watt, Correspondent

CW Communications International News Service
Susan Blakeney, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171 617/879-0700

Computerworld is a member of the CW Communications/Inc group, the world's largest publisher of computer related information. The group publishes over 70 computer publications in more than 28 major countries. Twelve million people read one or more of the group's publications each month. Members of the CWCI group contribute to the CW International News Service offering the latest on domestic and international computer news. Members of the group include: ARGENTINA'S *Computerworld Argentina, PC Mundo*; ASIA'S *Asian Computerworld, Communications World*; AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld*; AUSTRIA'S *Computerwelt Oesterreich*; BRAZIL'S *DataNews, PC Mundo*; CHILE'S *Informatica, Computacion Personal*; DENMARK'S *Computerworld Danmark, PC World Danmark, RUN*; FINLAND'S *Tietoviikko, Mikro*; FRANCE'S *Le Monde Informatique, Distributique, Golden, InfoPC, Theoreme*; GREECE'S *Micro and Computer Age*; HUNGARY'S *SZT Computerworld, Mikrovilag*; INDIA'S *Dataquest*; ISRAEL'S *People & Computers Monthly, People & Computers Weekly*; ITALY'S *Computerworld Italia, PC World Magazine*; JAPAN'S *Computerworld Japan*; MEXICO'S *Computerworld Mexico*; THE NETHERLAND'S *Computerworld Netherlands, PC World Netherlands*; NEW ZEALAND'S *Computerworld New Zealand*; NORWAY'S *PC Mikrodata, Computerworld Norge*; PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld*; SAUDI ARABIA'S *Arabian Computer News*; SOUTH KOREA'S *The Electronic Times*; SPAIN'S *Computerworld Espana, Commodore World, PC World Espana*; SWEDEN'S *Computer Sweden, Mikrodatorn, Svenska PC World*; SWITZERLAND'S *Computerworld Schweiz*; UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, PC Business World*; UNITED STATES' *Amiga World, Boston Computer News, Computerworld, Digital News, 80 Micro, FOCUS Publications, inCider, InfoWorld, MacWorld, Micro Marketworld, Network World, PC World, Publish!, RUN*; VENEZUELA'S *Computerworld Venezuela*; WEST GERMANY'S *Computerwoche, PC Welt, Computer Business, Run, InfoWelt*

Double-capacity disk storage unit debuts from Memorex

Proposed sale will have no impact, analyst says

By Donna Raimondi

SANTA CLARA, Calif. — Memorex Corp. today is expected to announce an IBM-compatible, double-capacity disk storage subsystem equivalent to IBM's 3380 Model E series.

The company, which could be sold before the end of the year, according to a spokesman (see story page 1), also released an Expanded Capacity Feature (ECF) for its 6880 solid-state disk subsystem and several products in its terminal and printer lines.

Whether the company is sold should not affect customer reaction to the new products, said industry analyst Louise Biggs of Dataquest, Inc. in San Jose, Calif. "End users for disk drives are not very vendor-loyal. Disk drives are a commodity. The end user chooses for reliability, serviceability and price — not for vendor," Biggs said.

Volume shipments of the 3682 double-capacity disk storage subsystem are planned for the first quarter of 1987. Burroughs Corp. plans to announce that the 3682 will be available in mid-1987 for attachment to its A and V series systems, Memorex said. It will take that long to engineer an interface for the Burroughs machines.

It is unlikely that Sperry Corp. will soon use the Memorex drives, Biggs said, because Sperry recently signed an agreement with Hitachi America Ltd. for double-capacity drives. "Although it would seem to make business sense for Sperry to use them, I don't know how solid the Sperry-Hitachi contract is," she said.

Full string holds 20G bytes

A full string of 3682 drives — a controller and four storage modules — holds 20G bytes of data and occupies slightly less floor space than a full string of IBM 3380 or Memorex 3680 single-density drives. Configurations range from the 3685 string controller and one 5G-byte 3682 storage module ($122,480) to the controller and four 5G-byte storage modules ($416,900).

Each dual-ported 3682 module contains two 2.5G-byte head disk assemblies and four independently addressable actuators, which have access to 1.26G bytes apiece. Average access time is said to be 17 msec. with a data transfer rate of 3M byte/sec. The 3682 can be used in conjunction with the Memorex 3888-23 disk cache storage control unit.

The solid state device's ECF boosts the Hitachi-made 6880's storage capacity from 512M bytes to 2G bytes. Users can choose 6880 configurations in 32M-byte and 128M-byte storage increments up to the maximum 2G bytes in a four-cabinet configuration. A 6880 subsystem with a two-director control unit and a 128M-byte storage unit costs $380,000. The price for the 2G-byte configuration with a two-director control unit and four 512M-byte storage units is $4.2 million.

Other products announced include intelligent workstations based on the Sperry PC/IT family of IBM Personal Computer AT-compatible microcomputers, terminal and printer products.

The Memorex 6273 series are IBM 3270-compatible workstations for coaxial environments. The workstations are based on the Sperry PC/IT and PC/MicroIT personal computers. They are said to provide 3270 network users with IBM and compatible mainframe access as well as extensive AT-compatible stand-alone processing capabilities.

The workstation series includes two compact versions, priced at $5,695 and $6,095, and two larger models, priced at $6,195 and $6,595. All four units use the Intel Corp. 80286 microprocessor, 640K bytes of memory, a 40M-byte hard disk drive, a 1.2M-byte floppy disk drive and Microsoft Corp.'s MS-DOS Version 3.1 single-user operating system.

Also announced were two modular-design display stations for the IBM 3270-compatible market. The displays are compatible with IBM 360, 370, 3080, 3090, 4300 and 8100 processors as well as IBM-compatible hosts, Memorex said. The displays operate in bisynchronous or Systems Network Architecture/Synchronous Data Link Control environments and can be attached to Memorex or IBM controllers via coaxial cable.

The $2,195 2180C 14-in. color display can display two, four or seven colors. Users can select from three screen formats that display up to 3,440 characters.

The $1,195 2291 12-in. monochrome display is plug-compatible for the IBM 3191 display station. The 2291 has a 122-key modifiable keyboard, green or amber screens and a 36-month warranty. The unit is said to consume about half the energy of an IBM 3191.

The 2124 Model E multifunction printer is a plug-compatible alternative to the IBM 4224 Model 202. It can be used in draft (350 char./sec.) or letter quality (80 char./sec.) mode in office or production environments and can print any of 10 bar codes or optical character readers. The printer will be available late in the fourth quarter of this year and costs $5,495.

▽ **Try ABR**

Innovation's Automatic Backup & Recovery System

Free for 90 Days

Incremental Backup — Backup of changed data sets.

Archiving & Superscratch — ABR will automatically backup and scratch data sets off disk and keep track of the data sets in it's own data base.

Automatic Recall — of Archived data sets under TSO or batch jobs.

Compression Option — Backup of Archived data sets in a COMPRESSed format.

DASD Management Report
- Backup and Archive report
- Wasted space report
- Generalized report writer...format your own report
- Extensive ICF VSAM reporting

Unlike device support, ISPF panels and much more...

1500 Users — Most widely used MVS disk management system

Performance — ABR is the fastest DASD management system. ABR will use less system resources than any other system.

COST — ABR is **$8,500** (perpetual license) for one CPU for existing FDR/COMPAKTOR customers. Non FDR/COMPAKTOR customers, total cost is **$16,500** (perpetual license).

Available for IBM VS1, MVS and MVS/XA systems.

For The Fastest DASD Management System... Fill in the coupon below or call INNOVATION at (201) 777-1940 for further information or a 90-day trial.

I am interested in ABR... Innovation's DASD Management System

☐ **Send Free 90-day Trial and T-Shirt**

☐ **Send FDR/ABR V5.0 User Manual and ABR Poster**

Name ____________________

Company ____________________

Address ____________________

City __________ State ______ Zip ______

Telephone (   ) __________ Ext ______

Mail coupon to: Innovation, 970 Clifton Ave., Clifton, NJ 07013-2793

INNOVATION
DATA PROCESSING
970 Clifton Ave., Clifton, NJ 07013-2793

Select IBM maintenance plan reborn as standard option

Corporatewide deal provides discounts

By Jean S. Bozman

IBM earlier this month terminated its Enterprise Maintenance Agreement program, a discount maintenance program formerly available only to top customers, and extended similar savings to more users under a general offering called the Corporate Service Amendment (CSA).

Until now, only IBM's top customers were offered large discounts on IBM maintenance. Under the earlier program, these customers had been given discounts of up to 15% on companywide maintenance.

The amendment to customers' IBM maintenance agreements will give users an average savings of 16% off IBM list prices for maintenance, provided they agree to certain qualifying conditions, according to IBM spokesmen. Chief among the conditions is a provision that users agree to troubleshoot system failures before calling IBM for repairs. IBM also offered to lower maintenance prices for IBM Personal Computers and peripherals by an average of 24%.

In order to qualify for CSA, the customer must first agree to an IBM on-site assessment of its systems procedures, which will cost the customer $3,500. The assessment of network maintenance procedures, which is more complicated, is priced at $8,500. IBM will reserve the right to grant or to deny qualification for the CSA plan.

IBM officials added that customers can qualify for CSA if they show a disciplined management of problems from occurrence to resolution, management of changes to equipment configuration or programming and network problem determination and application of specialized network knowledge to complex problems.

Qualification is based on the customer's ability to solve basic problems and to help IBM service reps by handling some troubleshooting before calling for service, IBM claimed.

The move is apparently intended to keep IBM competitive with third-party maintenance firms, such as Sorbus, Inc. and Control Data Corp. These third-party suppliers generally offer rates that are discounted by 20% or more from IBM list prices.

In place since 1984, the Enterprise Maintenance Agreement was offered to some of IBM's largest customers, many of them in the Fortune 100. The earlier program provided discounts on maintenance of all IBM machines throughout a customer's corporation, reducing monthly bills that ran into six figures.

To qualify, the customer had to agree "to develop, implement, monitor and maintain systems management procedures which cover the entire customer enterprise." Further, the company had to agree that, with the exception of a few non-IBM mainframes, all machines and all maintenance would be provided by IBM.

On Oct. 7, IBM officially terminated that plan, which had been open to "some of our very large customers" only, in the words of an IBM spokesman. But the Enterprise Maintenance Agreement already in existence will not expire until Oct. 31, 1987. These users will have until then to switch over to the CSA plan.

Competitors took the news well, having adjusted to the Enterprise Maintenance Agreement during the last year. "I'm not concerned about the IBM programs," said Steve Offield, president of Quadtronix, Inc., a Los Angeles maintenance firm, "because we offer more cost savings than any of the IBM programs do. And we offer improved performance that's documented by our customers. They have never had to call IBM for help."

Bozman is a Computerworld *contributor based in Chicago.*

Dough rises at Pillsbury MIS

From page 1

more harm than good by trying to propose titles like that that maybe inflate the position without necessarily having substance behind it," he said during an interview while visiting Dallas.

But Hammitt, 42, who reports to Pillsbury's executive vice-president and chief financial officer, Roger Headrick, says he firmly believes in the value of a corporate information strategist.

That has been his role since joining Minneapolis-based Pillsbury in 1983 after serving as director of information systems for Morton Thiokol, Inc.

Hammitt arrived at Pillsbury after the company had experienced a 10-year hiatus in substantial spending on information systems. "It was more and more difficult to know what was going on on a timely basis," he says. Different people had been in charge of various pieces of the information operation.

Hammitt moved in with a three-pronged strategy: to create a culture tying information systems investments more closely to bottom-line considerations, to bring on managers who are well grounded in general business and to tighten management through more stringent accounting, planning and personnel development.

Now, with an information technology blueprint in hand, Hammitt's department is on a track of 20% per year spending growth, a rate that about equals Pillsbury's gain in sales for the past fiscal year. It is introducing systems integrating IBM, Honeywell, Inc. and Hewlett-Packard Co. computers for planning production and distribution for Pillsbury's packaged food and for Burger King Corp. and other restaurant operations. The aim is to provide customers with the lowest possible delivered cost, Hammitt says.

Pillsbury also is in the final stages of testing the movement of networked computers into outlets of Miami-based Burger King and other restaurant chains, including Steak & Ale and Bennigans. Hammitt declined to elaborate on the projects, calling the details proprietary.

He says the company will realize returns of three to four times the cost of new systems within five years, but he is again taciturn on how the returns are calculated. "We know precisely where we're going to get those returns. We have very specific yardsticks," he says. Successful automation can come though a number of systems, no one of which would be profitable on its own, he adds.

Hammitt's peers cite his success at wedding information systems operations to corporate goals. "He has accomplished that very well in the three years," says Thomas E. Morin, vice-president of corporate services for Medtronic, Inc. of Minneapolis and president of the Society for Information Management executive council. "It's a very important function. Without that, what you have is people planning on the basis of the direction of the technology, rather than on what the business is doing," Morin says.

John G. Geiken, president of Norwest Information Services, Inc., a unit of the Minneapolis bank's holding company Norwest Corp., calls Hammitt a leader in that area. "I've been very impressed with what he's doing," Geiken says.

Hammitt's planning has resulted in a corporatewide information systems architecture incorporating data management, communications, hardware, software and users, according to consultant Richard Dooley of The Dooley Group.

As a by-product of that effort and of educating managers about information systems and networking with his peers, Hammitt has fostered an environment of interpersonal communication, a virtue that sounds like motherhood but has often been overlooked by more narrow technologists, Dooley added.

Hammitt, tall and angular, has been married four years to the vice-president of systems development at Burlington Northern Railroad Co. He combines what he terms a strong career focus with interests in cooking, travel, stereo equipment, theater and books that range from history to spy novels.

He first became involved with computers in managing process-control systems for CPC International, Inc., a New Jersey-based producer of packaged foods, and says his lack of a highly technical background has made it easier to keep such a view.

Hammitt says he believes the most important attribute of an information systems strategist is an ability to regard the systems with a long-term, companywide perspective, in order to anticipate problems and opportunities.

AT A GLANCE

Pillsbury

Sales (year ended May 31, 1986) – $5.85 billion

Net earnings (year ended May 31, 1986) – $208 million

Employees – 108,100

Businesses – packaged supermarket food, Burger King and other fast-food and full-service restuarants

Systems – IBM 4380 Model 2; IBM 4381 Model 1; Honeywell, Inc. DPS 8/70 in Minneapolis; installing distributed Hewlett-Packard Co. HP 3000s

"I see an awful lot of people in our profession today who, because they have operated so closely to the technology, lose sight of what value that has to the company at large," he says.

The key is to help top managers appreciate where investments in technology could make a difference, regardless of the details of the investment. "Not having that technical baggage, I've always focused on the larger picture and let a lot of the detail issues fall out of that," Hammitt says.

Other important attributes of the corporate information systems leader are the ability to market ideas and to manage people, he adds.

The individual must be able to read others, communicate effectively with them and, through his demeanor, convey a strength of conviction so that people believe in him as a person as well as in his ideas, Hammitt says. "If we are going to deliver people the promise of the technology, we are going to have to convince people to do things that they wouldn't normally do," he says.

The top information systems executive also must be able to seek out and identify talented people, motivate them and further develop their skills in order to build teams of people who can do extraordinary feats, he says.

"We're in a business climate now that requires that we distinguish ourselves from our competition in whatever way we can. I think that that comes through the creativity of finding some talented people and putting them together and getting out of the way, supporting them in their success."

Hammitt says he disagrees with the notion that the boss should tell other people what to do and be the smartest person in his group. "Our role as leaders is to be a catalyst and a facilitator and a talent scout," he says.

He emphasizes the difference between supervision and leadership. Some people are gifted leaders by birth or through experience, but others, with hard work, can learn enough to make a stronger contribution, he says.

Hammitt acknowledges that there are several aspects of his work that might not appeal to information systems managers aspiring to a similar role.

One is an atmosphere of ambiguity, as opposed to the one of precision of technical work. "The answers to most questions are, 'It all depends,' 'Perhaps,' because it's very difficult to find absolute answers to most of the issues we deal with," he says.

Taming the wild end user.

Is there a better reason to buy VMCENTER?

Taken one at a time, end users can be perfectly nice people. The trouble comes when you have to satisfy them all at once. While also doing everything else you have to do.

That's where VMCENTER comes in handy. Because while it's helping to keep end users on their best behavior, it can also improve just about every other aspect of data center operations.

VMCENTER is the world's leading data center management system for the VM operating environment. It's a single, comprehensive package combining everything from security and DASD management to resource scheduling, workload balancing, system accounting and disaster recovery. Not to mention a host of end-user convenience tools, including online help files and full-screen menus.

So while VMCENTER's great for end users, it's even better for you.

Give users what they need. Without giving up what you need.

What do users need? Access to resources. What do you need? Control over resources. Put the two together, and you'd better have VMCENTER.

VMCENTER makes it easier than ever for users to gain the access they need—while leaving you in ultimate control. It also minimizes scheduling conflicts, reduces maintenance time, and optimizes use of DASD. All while saving you money through a unique reporting system that helps you get more performance out of fewer resources.

So why let end-user demand drive you wild? Get everything under control—with VMCENTER.

VM Software, Inc., 1800 Alexander Bell Drive, Reston, Virginia 22091.

Subsidiaries: VM Software (UK) Ltd., Reading, Berks., UK, Telex 851849921; VM Software GmbH, Frankfurt, W. Germany, Telex 841411204.

VM Software
The VM Experts
800-562-7100
703-264-8000

VM SOFTWARE INC.

1-CWX-861020

Intel claims multitasking board brings 80386 power to AT

By David Bright

HILLSBORO, Ore. — Intel Corp. will today introduce an 80386-based add-on board that reportedly gives IBM Personal Computer AT systems the power of 80386-based systems at a much lower price.

According to James Johnson, general manager of Intel's Personal Computer Enhancement Operation (PCEO), the $1,995 board is a cost-effective way for managers to sample 80386 technology and extend the lives of their AT systems.

Johnson claimed there are two important reasons for buying the Inboard 386/AT board: multitasking support and a doubling of performance.

However, with IBM and Microsoft Corp. yet to fully validate the 80386 market with related MS-DOS products of their own, many managers were noncommittal about Intel's offering. At best, they expressed mild curiosity. Dan Chilcoat, manager of systems and programming at Adolph Coors Co. in Golden, Colo., said his company has some power users who could use the increased performance. Coors has already purchased one Compaq Computer Corp. Deskpro 386 to see what it can do and may investigate the Inboard 386/AT as well, Chilcoat said.

Although Johnson called the board's pricing aggressive, the Inboard 386/AT's extra cost could be an inhibiting factor for some managers. "It's a great idea. Tell them to cut the price in half," said Tony Graffeo, vice-president of MIS at Home Insurance Co. in New York. The days of expensive add-on boards are gone, Graffeo said. Since Home Insurance has many ATs, Graffeo likes the idea of upgrading the systems instead of replacing them, but added he would not consider buying the board in quantity until the price comes down.

While the 32-bit 80386 microprocessor supports multitasking, a common complaint from managers is that Microsoft has yet to offer a version of the MS-DOS operating system that takes advantage of that capability. But with software environments from Quarterdeck Office Systems, Inc. and Softguard Systems Co. supporting the 80386's virtual-86 mode of operation, AT users can run several applications programs simultaneously, Johnson said. He also expects other vendors to soon announce similar software environments.

"There's always a class of user who needs more speed," Johnson said, concerning performance. While there is not a mass market for this type of product, he said it will appeal to people in engineering and technical applications as well as business users who require more number-crunching power for such applications as large spreadsheets.

Johnson said the board's price could come down in the future. If the component costs drop low enough, PCEO might also offer a similar board for the IBM PC and XT systems, he added.

In its basic configuration, the Inboard 386/AT board includes a 16-MHz 80386 and 64K bytes of cache memory. According to Johnson, the board is completely compatible with existing hardware and software. The Inboard 386/AT is activated by unplugging an AT's 80286 processor and inserting a connection to the board.

With 1M byte of on-board memory, the board retails for $2,495. A piggyback board, priced at $645, adds an extra 1M byte of memory or, for $1,145, an extra 2M bytes. The board is to be available in January 1987.

One vendor developing an 80386-based accelerator board maintained that the 80386 has inherent compatibility problems. Trevor Marshall, director of engineering at Definicon Systems, Inc. in Westlake Village, Calif., said that because of those problems, his company's board will have trouble running copy-protected software and software that directly accesses the BIOS.

Marshall claimed all 80386-based products could have similar difficulties. At next month's Comdex/Fall show in Las Vegas, Definicon will introduce its DSI-386 board with 1M byte of random-access memory for about $2,000, Marshall said.

The compatibility issue was a major reason why 80286-based accelerator cards did not catch on as hoped. Despite the 80286-based boards' lack of popularity, several vendors, such as Phoenix Technologies Ltd. and Applied Reasoning Corp. are busy developing 80386-boards for late 1986 or early 1987 introduction.

9370 seen as bridge

From page 1

a distributed processing environment, he adds. "This should help IBM keep its customers from going to other vendors."

Arsenal of enhancements

IBM hopes the 9370's arsenal of connectivity enhancements will enable it to conquer more territory for the 370 line in both the office automation and scientific/engineering markets, says Lon McCauley, IBM consulting market support representative.

As a departmental office system, the 9370 can be "low-cost and unobtrusive, running the same software as the bigger host processors, including the Professional Office System, and can be integrated into a company's existing network solution," McCauley notes.

The 9370's ability to communicate easily with other 370 hosts and run VM software make it a prime candidate to be a departmental processor for Blue Cross/Blue Shield of Massachusetts, according to Sperandio. Various departments within the company currently suffer from response-time problems while running high-volume, interactive applications on the company's remote 370 mainframe.

"It would be nice to take accounts payable, for example, and run it in on a local processor in that work area, then transfer the files up to the mainframe at night," Sperandio says. But to accomplish that, he said, the company needs a departmental processor architecture that is compatible with the larger system. "That rules out the System/36," Sperandio says.

Primary market targets

IBM's primary target for the 9370 are those in the scientific and engineering markets "who are worried about how to link their IBM MIS systems with their existing VAX installations," notes Brian Jeffrey, director of research at International Technology Group in Palo Alto, Calif.

Such a company is Ashland Oil, Inc. The Ashland, Ky., company's coal division is currently considering the 9370 as a way to connect its IBM 370 hosts and DEC VAXs, according to information center manager Ray Parker. "We are also considering using device attachment control units, but we hear that the 9370 may be more efficient and cost-effective," Parker says.

Device attachment control units are intelligent interfaces that can be software-configured to provide protocol conversion between an IBM 370 host and other communications environments — in particular, the Ethernet local-area networks (LAN) running TCP/IP that are in wide use at scientific and engineering firms.

"When IBM is bidding on a contract with a company that already has a big installed base of Hewlett-Packard or DEC, it sends in its Multivendor Connectivity Center people from Atlanta," Jeffrey says. "Like a SWAT team, they provide whatever connection is needed through the device attachment control units."

The 9370 provides the same connectivity, but through expansion boards that are far less expensive and easier to install than outboard box solutions such as device attachment control units and 3720 and 3725 communications controllers, McCauley claims. Users can interface a 9370 with different networking environments by implementing subsystems consisting of a communications processor and different combinations of adapters that fit directly into expansion slots.

The telecommunications subsystem supports asynchronous, bisynchronous and Synchronous Data Link Control connections over telecommunications lines.

ASCII applications

The ASCII subsystem enables terminals to run ASCII applications on a 9370 supporting IX370, IBM's version of Unix, and operate printers and plotters on the host. It also converts ASCII terminals to 3270 mode, allowing them to run VM applications and use the 9370 as a gateway to applications on other SNA hosts.

Both the IBM Token-Ring and Ethernet 802.3 LAN subsystems will support TCP/IP when they are released in third-quarter 1987. "This will enable multiple 9370s and RT Personal Computers, as well as non-IBM processors supporting TCP/IP, to communicate over either Ethernet or the Token-Ring," McCauley says.

The adapters also provide a direct link to a LAN, compared with other 370 hosts that require a communications controller or network control processor to act as an interface.

The direct network interface also enables multiple 9370s running VM/VTAM to communicate directly over a LAN, McCauley says. "With multiple 370 hosts attached via outboard controllers, you just have workstations talking to hosts over the network," he adds.

"This is the first time that IBM has built communications with non-IBM systems into one of its host operating systems," Jeffrey notes.

The 9370 introduction also includes Transparent Services Access Facility (TSAF), a software program that handles VM communications functions and allows transparent access to SQL data bases on up to eight hosts.

Sperandio of Blue Cross/Blue Shield admits he is interested in the 9370's enhanced connectivity features. "I'd have to see them in action before I decide how useful they are," he concluded.

Data Processing Challenges

Growing...dynamic and putting together the best people possible ...that's Coatings Service, the largest coatings service operation in the world.

PROGRAMMER ANALYST
Position requires 2-5 years of HP 3000 experience, proficiency in COBOL; an Image Data base background and a BS in Computer Science, related field or equivalent experience. Manufacturing or financial experience sought.

HP 3000
SYSTEMS ENGINEER
Position requires up to 5 years of HP 3000 hardware operation experience, and a BS in Computer Science or related field. Knowledge of Pascal language sought. You will be involved in data communications, limited programming and hardware trouble shooting.

Coatings Service offers an environment that is unsurpassed in challenge and potential. Our exceptional compensation and benefits package includes an attractive retirement plan, educational assistance, investment alternatives and more. Submit your resume including salary history to:

UNION CARBIDE
COATINGS SERVICE

Trudy Jacobs
UNION CARBIDE CORPORATION
COATINGS SERVICE DEPARTMENT
1500 Polco Street
Indianapolis, IN 46224

Equal Opportunity Employer M/F

ACCESS GOLDENGATE. PIC 'N PAY DID.

"Our PCs have actually become general purpose computers with automated applications, database, graphics and spreadsheet capabilities. GOLDENGATE made it happen."

George Waybright
Director of Management
Information Services
Pic 'N Pay Stores, Inc.

Getting the right merchandise at the right price to the right place at the right time is a challenge for any retailer. But when you're expanding by 80 stores a year – like Pic 'N Pay Shoes is – it requires some pretty fancy information system footwork. No wonder the largest self-select shoe chain in the Southeast selected Cullinet Software for its versatile Information Center Management System.

GOLDENGATE was the personal information system they picked. And it's paying off every day. With GOLDENGATE in place, PC users at Pic 'N Pay have ready access to mainframe data. And they have powerful tools at the micro level to analyze that data. The integrated functionality of GOLDENGATE results in more consistent, more timely decision-making.

GOLDENGATE responds where ease-of-use is critical. All GOLDENGATE tools are operated by a single set of command verbs and utilize a common screen format to shorten the learning curve. For Pic 'N Pay, GOLDENGATE delivered quick solutions to complex business problems. It's uniquely qualified for handling frequently performed tasks. Monthly reports can be automated, performance analyzed, and data and graphics easily updated.

For complete details on how your company can Access Cullinet through GOLDENGATE and other Information Center Management System products, call toll-free 1-800-551-4555. In Massachusetts, call 617-329-7700. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Cullinet

An Information Technology Integrator
For the 80s, 90s And Beyond.

Users struggle toward unified OA network

By Mitch Betts

WASHINGTON, D.C. — Information systems managers attending an office automation show last week said they were struggling to find ways to tie complicated, multivendor systems into a single OA system.

Reynold A. Lawyer, network manager for C&P Telephone Co. in Silver Spring, Md., said he attended the jointly held National Office Automation Conference and Federal Office Automation Conference in hopes of finding vendors that could link his new Digital Equipment Corp. VAX 8650 with systems from Data General Corp. and Wang Laboratories, Inc.

"I've found people who could do one or the other, but not both," Lawyer said. "I'm trying to sell my management on using DEC's All-In-1 as the main OA system, but first I've got to prove to them that it can talk to DG and Wang," he added.

William H. Conklin, a project manager for Merck & Co.'s pharmaceutical labs in Elkton, Va., said he is leaning toward a Hewlett-Packard Co. HP 3000 for a remote OA system but first must ensure that it can be linked to Merck's corporatewide Wang electronic mail system.

Users at the show criticized IBM's OA strategy as a confusing array of incompatible lines.

One VAX user, Francis J. DeHoratius, director of administrative computing at St. Joseph's Preparatory School in Philadelphia, said he selected a VAX 750 instead of an IBM product because DEC officials were willing to locate a vendor with the appropriate administrative software and would locate similar user sites.

"I guess IBM figured we were small potatoes, because they weren't interested in finding us software," he said.

After changes, delays, Wang rolls out Laptop

Greatest benefit seen in terminal functions

By Donna Raimondi

Wang Laboratories, Inc. last week finally announced the Laptop computer it has been showing to selected users last summer.

The 14¼-lb unit, which will cost more than $4,000 in any configuration — with modems, communications and application software — contains an internal 10M-byte fixed disk, a built-in near-letter-quality printer and a full-size keyboard with programmable function keys. The Laptop is manufactured by Brothers Industries Ltd. in Japan and runs under Microsoft Corp. MS-DOS 3.2.

The Laptop will probably sell well to Wang's established customer base, predicted Vincent Flanders, associate editor of *Access 86*, a magazine for Wang users. Users who have seen the machine say it is function-rich but expensive, Flanders said. Wang showed the unit to users last summer as part of its market research. The results of user input delayed announcement of the machine so the company could incorporate features it wanted, Wang said.

"The system will sell as an addition for Wang's installed base of customers or as a freestanding system that will be compared to all the other laptops out there," said Charles Casale, executive director of the Boston-based Yankee Group's financial division. As the former, it is not overpriced, but as competition for the freestanding units, it is, he said.

The unit will not have a significant impact on Wang's financial health, he predicted. "This is not the home-run product that Wang needs. It's a single base hit product. It is good news for Wang, but not outstanding," Casale said.

Although the basic unit costs $3,530, many of the features needed to make it a useful portable machine are optional. Adding an internal modem costs either $425 or $795 depending upon whether the user chooses a 300/1,200 bit/sec. or a 300/1,200/2,400 bit/sec. unit.

Wang Systems Networking with point-to-point transfer costs $400; Wang's Integrated Word Processing adds another $385. Diskette drives cost $365 for a 360K-byte drive and $518 for a 720K-byte option. A memory expansion card to double the main memory costs $695, and any software needed other than the Basic language is additional.

The additional costs are not a problem for one of the unit's first users, said Art Rushing, regional director of finance at the U.S. Postal Service, Southern Region, in Memphis.

"We have been pushing Wang to come out with a portable that has all the functions of a Wang PC, and we are elated with the Laptop. You have to weigh price against functionality," Rushing said. The Postal Service Laptops will interface with his VS systems, act as VS workstations and allow Rushing to redeploy some of the bigger workstations to staff members who use them six or eight hours a day.

According to Rushing, the Laptops will be especially appropriate for executives, who use the system for shorter periods of time. "I can pull the screen off the Laptop and plug it into a high-resolution monitor on my desk, and I can print out on the VS system's printer instead of the internal one," he added.

Wang is working with major software vendors such as Ashton-Tate, Autodesk, Inc., Lotus Development Corp. and Oracle Corp. to develop Software Solution Sets — groups of application software packages that include Wang core and distributed software packages that meet particular user needs.

Wang laptop
Basic configuration: $3,530

Microprocessor: NEC V30 16-bit CMOS
Main Memory: 512K bytes
Storage: 10M-byte internal hard disks
Weight: 14.25 lb
Power: Battery pack, AC adapter
Display: 80-col. by 25-line LCD
Printer: 18 char./sec. burst mode

CW Chart

Off-the-shelf products like Lotus's 1-2-3 spreadsheet will run on the Laptop, but if the customer needs 1-2-3 plus Wang word processing and other specific packages, Wang will either put together or help the customer put together everything he needs, according to Paz Kahana, senior marketing manager for desktop systems.

The Laptop, available in late November, is targeted to mobile professionals such as field personnel engaged in customer and client contact. Wang is selling the unit through direct distribution channels and not through its OEMs or value-added resellers.

The Laptop includes 512K bytes of random-access memory, expandable to 1M byte, a 25-line by 80-character supertwist LCD screen and 16 function keys that, when shifted, provide 32 functions. Supertwist LCD is a technology that enhances the mechanism that handles reflections on the screen, Kahana said. Users can access Wang or IBM software from the same menu, a spokesman said. The Laptop connects to Wang's VS, OIS and PC products and can emulate Digital Equipment Corp.'s VT100 or IBM's 3270 terminals.

"If I were a Wang customer, I'd use it as my permanent machine that I can move around," Casale said. Not having a built-in floppy disk drive is not a liability because the 10M-byte internal drive will handle all systems and some applications software, he added.

For the Postal Service, the built-in printer is extremely important, especially to Postal Service auditors, who will be able to prepare and leave comments and observations at the work sites they travel to, Rushing said.

"The need is for one or two pages, so the slow speed is not a problem," he said. "I have observed a number of laptops, but it takes a 25-lb briefcase to carry the peripherals on most of them. That would include a printer, the acoustical interface [modem] and one or two external disk drives. This unit is self-contained," he said.

UNIX
BACKUP AND
SECURITY
AND MORE! (PRINT SPOOLING AND BATCH JOB SCHEDULING)

UCONTROL
BUY 3 PRODUCTS IN 1 AND SAVE MONEY, TIME, AND HASSLE.

See us at FCC Booth No. 1348 and UNIX EXPO Booth No. 239.
For more information, call or write. (703) 734-9844

UNITECH SOFTWARE INC
8330 OLD COURTHOUSE ROAD, SUITE 800
VIENNA, VA 22180
TELEX 197817 UNITEC UT

UNIX is a trademark of AT&T Bell Laboratories

IF IBM AND DEC TIED FOR SECOND, WHOSE DBMS WAS FIRST? ORACLE.

Today, computer users polled in the *Software User Survey* rank Oracle Corporation as their number one vendor choice for 1986. ORACLE® is the number one relational DBMS, with thousands of installations on IBM mainframes, DEC, DG, HP and most other vendors' minis and micros, including the IBM PC. In fact, *INC. MAGAZINE* ranks Oracle as the fastest-growing major software company in the USA.

Surprised? Don't be. Oracle introduced the first relational DBMS and the first implementation of SQL back in 1979.

COMPATIBILITY

The ORACLE® relational database management system is compatible with IBM's SQL/DS and DB2. SQL/DS and DB2 represent IBM's latest generation of database management technology for IBM's largest computers. ORACLE's capabilities and user interface—the SQL language—are identical to those of SQL/DS and DB2. Programs written for SQL/DS and DB2 will run unmodified on ORACLE.

PERCENT
CONSIDERING
DBMS
VENDOR
FOR
1986

1986 RANK

1	Oracle	14.6%
2	DEC	12.2%
3	IBM	12.2%
4	Software Vendor	7.3%
5	Hardware Vendor	7.3%

SOURCE: *1986 Software User Survey**

PORTABILITY

SQL/DS and DB2 run only on IBM mainframes; ORACLE runs on IBM mainframes, DEC, DG, AT&T, HP, Stratus, Sperry, Prime, Honeywell and several other manufacturers' minicomputers, and on a wide range of microcomputers including the IBM PC/XT and PC/AT. ORACLE runs under MVS, VM/CMS, VMS, PC-DOS, AOS/VS, UNIX,™ etc. All versions of ORACLE are identical and include a complete implementation of SQL—not a subset.

CONNECTABILITY

Having the same software running on your mainframe, minis, and micros greatly simplifies the task of connecting your machines into a network. ORACLE's network software allows micro-computer users to directly access data stored in the shared database on the mainframe or minicomputer, or copy that data into the database on their micros and operate independently.

To attend the next free, half-day seminar in your area or receive additional information, write Oracle Corporation, Dept. SW2, 20 Davis Drive, Belmont, CA 94002, or call 1-800-345-DBMS.

U.S. SEMINARS

AK	Anchorage	Sep 9
AL	Huntsville	Dec 9
	Mobile	Sep 10
AR	Little Rock	Sep 30
AZ	Phoenix	Aug 5, Oct 16, Dec 2
CA	Los Angeles	Aug 6, Sep 11, Oct 14, Nov 13, Dec 16
	Newport Beach	Sep 25, Nov 11
	Sacramento	Jul 22, Sep 18, Oct 30
	San Diego	Aug 7, Oct 7, Nov 6
	San Francisco	Aug 5, Sep 9, Oct 14, Nov 6, Dec 9
	San Jose	Aug 7, Sep 23, Oct 21, Nov 13
CO	Denver	Sep 18, Oct 21, Dec 10
CT	Hartford	Sep 10, Oct 22, Nov 13
	New Haven	Aug 20, Oct 8, Dec 4
FL	Ft. Lauderdale	Nov 19
	Jacksonville	Aug 5
	Orlando	Sep 17, Nov 18
	Tampa	Aug 6
GA	Atlanta	Sep 23, Nov 6
	Columbus	Oct 8
IA	Des Moines	Aug 27, Oct 29, Nov 11
ID	Boise	Jul 31, Sep 11
IL	Chicago	Aug 14, Sep 18, Oct 9, Nov 5, Dec 18
IN	Indianapolis	Aug 19, Oct 15, Dec 9
KS	Wichita	Sep 4
KY	Louisville	Aug 7
LA	New Orleans	Sep 25, Dec 9
MA	Boston	Sep 16, Oct 15, Nov 12, Dec 10
	Burlington	Aug 12
	Springfield	Sep 18
MD	Bethesda	Jul 23, Aug 7, Sep 4, Oct 1, Oct 16, Oct 29, Nov 13, Dec 10
MI	Detroit	Aug 19, Sep 16, Oct 14, Nov 18
	Grand Rapids	Oct 16
MN	Minneapolis	Jul 22, Sep 9, Nov 4, Dec 18
MO	Kansas City	Nov 12
	St. Louis	Jul 30, Sep 25, Nov 19
MS	Jackson	Sep 11
NC	Charlotte	Nov 6
	Raleigh	Oct 8
NE	Omaha	Sep 24
NJ	Cherry Hill	Nov 20
	Convent Station	Aug 7, Aug 28
	Iselin	Jul 22, Sep 16, Oct 9, Oct 30, Nov 13, Nov 20
	Princeton	Sep 25
NM	Albuquerque	Sep 16, Dec 10
NY	Albany	Jul 23, Sep 11, Nov 20
	New York City	Jul 24, Aug 12, Aug 26, Sep 3, Sep 17, Oct 2, Oct 22, Nov 6, Nov 25, Dec 9
	Rochester	Aug 13, Sep 9, Oct 15, Nov 18, Dec 10
	Syracuse	Aug 19, Oct 21, Dec 16
OH	Akron	Jul 23
	Cincinatti	Aug 5, Oct 21
	Cleveland	Jul 22, Sep 23, Oct 28, Nov 13
	Columbus	Aug 12, Sep 24, Oct 29, Nov 12
	Dayton	Sep 9, Nov 5
OK	Oklahoma City	Sep 3, Dec 3
	Tulsa	Aug 26, Nov 19
OR	Portland	Jul 24, Sep 23, Nov 6
PA	Allentown	Sep 11
	Harrisburg	Nov 6
	King of Prussia	Jul 24
	Philadelphia	Oct 9
	Pittsburgh	Aug 7, Oct 16, Dec 9
	Scranton	Aug 5
SC	Charleston	Oct 7
TN	Memphis	Sep 18
TX	Amarillo	Oct 9
	Austin	Sep 18, Nov 6
	Dallas	Jul 22, Sep 9, Oct 14, Nov 18, Dec 11
	El Paso	Dec 18
	Ft. Worth	Sep 23, Nov 13
	Houston	Aug 19, Sep 11, Oct 16, Nov 20, Dec 4
	Lubbock	Oct 2
	San Antonio	Aug 27, Nov 5
UT	Salt Lake City	Aug 6, Sep 16, Oct 7, Dec 4
VT	Burlington	Aug 6
VA	Richmond	Sep 10
WA	Seattle	Oct 23, Dec 11
WI	Milwaukee	Sep 9, Nov 13

CANADIAN SEMINARS

Calgary	Sep 25
Halifax	Oct 15
Montreal	Aug 20, Sep 17, Oct 15, Nov 24, Dec 17
Ottawa	Aug 7, Sep 11, Oct 9, Nov 13
Quebec City	Sep 10, Nov 12
Toronto	Aug 12, Sep 9, Oct 7, Nov 4, Dec 2
Vancouver	Oct 2
Winnipeg	Aug 5, Oct 16, Dec 4

ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

Ottawa (613) 238-2381 ☐ Quebec (514) 337-0755 ☐ Toronto (416) 362-3275
ORACLE-U.K. (SURREY) 44-1-948-6976 ☐ ORACLE-EUROPE (NAARDEN, THE NETHERLANDS) 31-2159-49344

Call (800) 345-DBMS today.

©1986 by Oracle Corporation. ORACLE® is a registered trademark of Oracle Corporation. SQL/DS, DB2 and IBM are registered trademarks of IBM. DEC, DG, AT&T, Stratus, HP and Bell Laboratories own numerous registered trademarks.

*Published by *SOFTWARE NEWS*, minicomputer section. Copyright © 1986 by Sentry Publishing.

TRBA.

DEC soars, IBM struggles

From page 1

focused in the fastest growth area of the industry," said Jay Stevens of Dean Witter Reynolds, Inc. "Even IBM, in its 9370 announcement, identified that as the highest growth sector. But IBM still derives the largest part of its business from mainframes, which are very slow right now." Mainframe vendors Amdahl Corp. and Honeywell, Inc. also reported slow quarters (see story page 142).

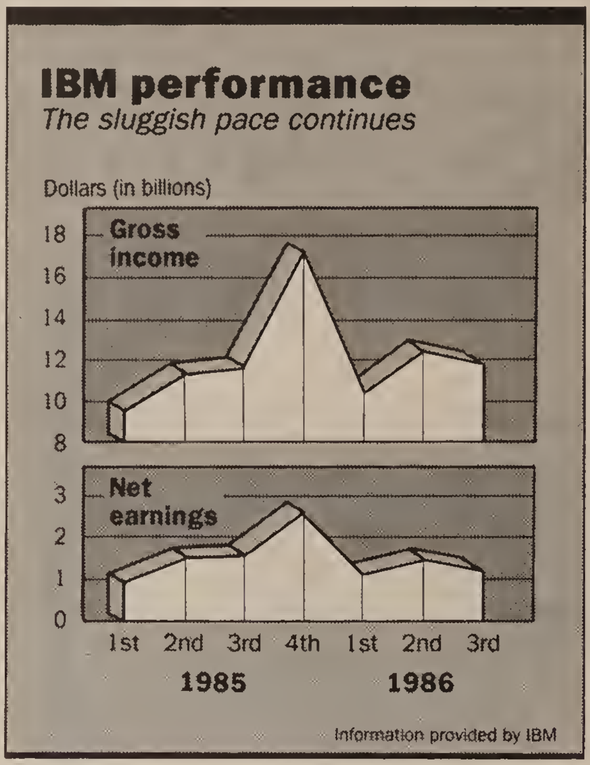
Stevens said that trend is even more pronounced in overseas markets, where IBM's strong sales have been slowing while DEC's continue to improve. "The installed base in Europe, for example, does not have the preponderance of large mainframes that the U.S. does," he said. "The largest companies are much smaller than in the U.S., and the size of their computers follows suit."

Although IBM is shifting a large percentage of its hardware revenue from rentals to sales, it still suffered a 0.7% drop in revenue from sales. Rental revenue fell 35% from year-earlier levels, while revenue from services grew 20%.

Net income dropped to $1.08 billion, or $1.76 per share, from $1.47 billion, or $2.40 per share, in the third quarter of 1985. IBM's nine-month earnings are lagging 12% behind last year, and Big Blue is certain to record its second straight annual decline in profits for the first time since the Depression.

IBM's fortunes, moreover, are not likely to turn around in the near future. Recent mid-range product introductions and an unprecedented corporate cost-cutting campaign are not expected to impact the bottom line until at least the middle of 1987.

"They should be in a good position to capitalize on an economic improvement, but no one can figure out when that will come," said Drexel Burnham Lambert, Inc. analyst Peter Labe. "Right now they're going through a tough period in capital spending at the same time they're trying to get their product act together."



IBM performance

The sluggish pace continues

Information provided by IBM

JEFF BABINEAU

DEC, for its first fiscal quarter ended Sept. 27, posted earnings of $182.6 million, or $1.37 per share, compared with $72.3 million, or 60 cents per share, in the year-earlier period. Overall sales passed the $2 billion mark for the first time at $2.04 billion, up from $1.62 billion in the first quarter of fiscal 1986.

"The story behind DEC is market share gains in the middle range, at the expense of IBM and others," said Marc Schulman of Salomon Brothers, Inc. "It is DEC that is getting the lion's share of new applications in companies that are bringing them up, particularly in networking."

Schulman also cited the improvement in DEC's gross margins (the difference between a firm's pretax revenue and its costs). That margin reached 49.6% in the quarter, up roughly 10% in the past year, thanks to higher margin VAX systems replacing PDP-11s and lower production costs. "That improvement is nothing short of extraordinary," Schulman said.

IBM, by contrast, has higher margins than DEC's, but they are declining. "IBM's projected industry growth rate has been too high," Dean Witter's Stevens said. "When a company projects too much revenue, it winds up in an earnings squeeze, and that has happened."

An IBM spokeswoman said the year-to-year earnings drop was IBM's largest since the Federal Accounting Standards Board required firms to restate their earnings in 1981.

Krowe, a senior vice-president, will be in charge of the Information Systems and Communications Group, the unit that includes personal computers, workstations and networking communications, and the Information Systems and Products Group, which includes mid-range computers, low-end storage products and financial systems and peripherals.

"They want a more senior management focus in those areas," IDC's Hart said. Krowe has gone from the corporate office with a staff of about 100 to critical line management with responsibility for tens of thousands."

The two units formerly reported to Senior Vice-President Jack D. Kuehler, who retains responsibility for the storage and systems technology groups.

Introducing TRAPS.™
(Testing, Recording, and Playback System)

Captures bugs in your online systems.

For high quality, trouble-free software, TRAPS is the fast, inexpensive way to debug online host applications. PC-based and menu-driven, TRAPS records and stores test cases on your PC for later playback in any combination or order you choose. During playback, the system automatically compares the new host responses against the recorded responses. Differences are then saved in the PC for convenient review and edit off line. With TRAPS, you save time and money while delivering fully-tested, error-free code.

- Captures and compares keystrokes and screens to isolate errors automatically.
- Interacts with CICS, IMS, TSO, CMS, DB2 and more.
- Eliminates test data keystroke errors to ensure repeatability and consistency.
- Conserves host resources by using the PC for test case creation, storage, and maintenance.
- Provides portability of test scenarios via diskette or token ring to project teams, quality assurance, and end users.
- Generates detail reports showing mismatches, response times, and control information.
- Automates acceptance and regression testing through the project life cycle.

For more information, contact TRAVTECH, subsidiary of The Travelers, at (203) 277-9595.

TRAVTECH Inc.
One Tower Square
Hartford, CT 06101

TRAPS™ is a trademark of The Travelers Companies.

Sometimes the impossible is possible

Run your IMS/DC applications under CICS with...

VISION/1

Challenge us!

STAR

Software Technologies and Research, Inc.
160 West Street Cromwell, CT 06416-1930
In CT 203-529-7128 1-800-258-STAR

NCR beats ‘who’s who’ of vendors for $20M Hutton PC deal

Will ship 10,000 units over next two years

By Alan Alper

NEW YORK — E. F. Hutton & Co. last week disclosed that it selected NCR over a veritable “who’s who” of computer systems vendors to supply it with 10,000 IBM Personal Computer AT-compatible workstations over the next two years.

The NCR-supplied color workstations will replace the decade-old Bunker-Ramo L dumb terminals on Huttons’ brokers’ desks, providing access into the firm’s corporatewide information network. Hutton said it is purchasing the workstations at a cost of $20 million, which includes installation and service.

NCR formally unveiled the workstation it is selling to Hutton at a press conference held at the brokerage’s headquarters here last week. Called the 3390, the AT-compatible workstation makes extensive use of very large-scale integration and surface-mount technology and features 3½-in. disk drives, which enabled NCR to design a microcomputer with a small footprint, the firm said.

Hutton said it would begin testing the 3390 workstation during the first quarter of next year and would conduct a pilot program at the branch level the following quarter.

Domestic, Japanese, European vendors

While declining to identify what firms competed with NCR for the contract, Richard P. Rittereiser, Hutton president and chief operating officer, said the Dayton, Ohio, firm was chosen over a number of domestic, Japanese and European vendors. Sources said that while firms such as AT&T, Data General Corp. and Wang Laboratories, Inc. initially vied for the contract, NCR won out over Hewlett-Packard Co. and IBM, which bid an unannounced product.

Charles Exley, NCR’s chairman, last week credited the winning bid to “having a product that in terms of timing and functionality fits perfectly with what Hutton wanted.”

While some analysts have continually questioned NCR’s participation in the personal computer business, Exley said the Hutton contract “is yet another validation of the correctness of a strategic decision made several years ago to make a major investment in personal computing technology.”

Disclosure of the winning bidder was expected to be made by Hutton last month but was delayed at NCR’s request, noted Bernard Weinstein, Hutton’s vice-president of communications, branch information systems and programming. “We wanted to make the announcement earlier but NCR was not ready to release the product,” Weinstein said.

The NCR workstation, which Hutton has customized and dubbed Advanced Workstation for the Executive (AWE), is the culmination of the brokerage’s decade-long attempt to create a single network that can be accessed by all its brokers [CW, Aug. 11].

The network’s four-tier architecture includes four IBM 3080 and 3090 mainframes in New York, 40 DG Eclipse minicomputers at its regional offices and a DG MV minicomputer in each of the firm’s 400 branches.

By using AWE, brokers can extract a wide array of real-time and historical data on a multiplicity of securities, which can be displayed in a variety of colors, layouts and formats. The workstation can also access financial information services, such as Dow Jones News/Retrieval.

AWE reportedly runs the full gamut of applications software that is compatible with Microsoft Corp.’s MS-DOS. It also has been customized to run DG’s CEO office automation software, which provides word processing and electronic mail, among other capabilities.

NCR said its 3390 workstation can be arranged in a variety of configurations through the use of “personality cards,” which provide video, disk drive and device controllers as well as memory expansion on a single board.

The 3390 is designed around the Intel Corp. 80286-10 microprocessor, which operates at 6 or 10 MHz, and runs NCR-DOS, the firm’s MS-DOS-compatible operating system.

The workstation can be connected to local-area networks or directly attached to departmental or mainframe computers.

Three versions are offered: a diskless model, priced at $1,694, for networking applications; a single 720K-byte floppy unit, priced at $1,804; and a 20M-byte hard disk version priced at $2,789. Deliveries are expected to begin in November, NCR said.

Series/1

- Custom Software & Systems
- RPS Specialists
- All types of communications
  Async • SNA • LU 6.2 • CM
- In-house Series/1 development laboratory

Applied Management, Inc.
1350 Piccard Drive, Suite 210
Rockville, Maryland 20850
301-670-4220

Testing & Debugging with Confidence!

THE XPEDITER® Advantage.
“THE INDUSTRY LEADER FOR TESTING AND DEBUGGING”

The only tool you need for multiple environments:

- MVS • MVS/XA • VM/CMS
- COBOL • Assembler
- Full-Screen Interactive (TSO/ISPF, CMS, etc.)
- Batch (ADR/ROSCOE*, TSO/ISPF, etc.)
- IMS/DC • BTS • CICS • HOGAN**
- Supports Popular Databases, Application Generators and Optimizers

*ADR/ROSCOE is a Registered Trademark of Applied Data Research
**HOGAN is a Registered Trademark of Hogan Systems, Inc

APPLICATION DEVELOPMENT SYSTEMS, INC.

CALL FOR YOUR FREE INFORMATION PACKET:
1-800-358-3048
in Minnesota & Canada: 612-560-8633
OR WRITE

APPLICATION DEVELOPMENT SYSTEMS, INC.
6840 78th Ave. North
Minneapolis, MN 55445-2760

✓ Please send me more information on XPEDITER.®

Name ______ Title ______
Company ______
Co. Address ______
City ______ State ______ Zip ______
Telephone ____-____-____

User claims Cobol generator allows cooperative processing

Says IBM mainframe, PC applications tied

By Charles Babcock

CAMBRIDGE, Mass. — A user of a Cobol application generator from the Computer Corporation of America (CCA) recently said the product opens the door to cooperative processing between applications on IBM mainframes and those on IBM Personal Computers.

Cooperative processing among interdependent applications on different processors has been a stumbling block for data processing departments for many years because of the lack of ways to overcome incompatible operating systems.

CCA has written an IBM PC version into Release 5.0 of Accolade, a mainframe application generator; this version may be used to develop applications that can run on the PC or be transferred to run under CICS on the host.

By using Accolade, a Cambridge software house has both off-loaded its CICS application development to IBM PCs from its time-shared mainframe and developed software with cooperative processing features.

Martin Flusberg, president of Multisystems, Inc., an applications software house, said Release 5.0 has a built-in file server that allows the automatic transfer of files between applications running on a PC and a host. He added that Multisystems has been using Release 5.0 in various forms for a year.

In a project management application, Flusberg said, a project manager may request files on a particular project, have them delivered to his PC, work with them and return them to the mainframe host without issuing any commands to the mainframe data base. An application on the mainframe similar to his PC software processes his request for the files, making sure he has the proper security clearance, and downloads them.

"The file server capability makes it very easy to move things between applications," Flusberg said.

In another application under development, Multisystems will aim to make it possible for truckers to enter freight data at remote sites by having their shipments checked against a central data base. If freight is transferred to another trucking firm and the fee is split, local data entered on an IBM PC will record the point of transfer and calculate the revenues for each, Flusberg said.

The results of the data entry and calculations will then be uploaded to a mainframe host, where additional processing will record the shipment and calculate the bill to be sent to the shipper.

"The local data is used for a multitude of other purposes" by being processed through an application on the mainframe that is similar to the one used on the PCs in the field, Flusberg said.

"For my money, Accolade offers a building block to cooperative processing," said Vaughan P. Merlyn, an application development consultant in Marietta, Ga.

Merlyn said there are few cooperative processing applications in use through Accolade, which has a limited installed base of about 100 customers, or through any other product, because "shops are not sufficiently sophisticated in their thinking to make use of cooperative processing."

> **"**
>
> ***'Shops are not sufficiently sophisticated in their thinking to make use of cooperative processing.'***
>
> Vaughan P. Merlyn
> application development consultant

With its ability to generate CICS Cobol applications on either the mainframe or the PC, Accolade will be primarily used for off-loading development tasks from the mainframe, Merlyn predicted, but cooperative processing remains a possibility as soon as developers seize on it.

"It's a first step toward cooperative processing," he added.

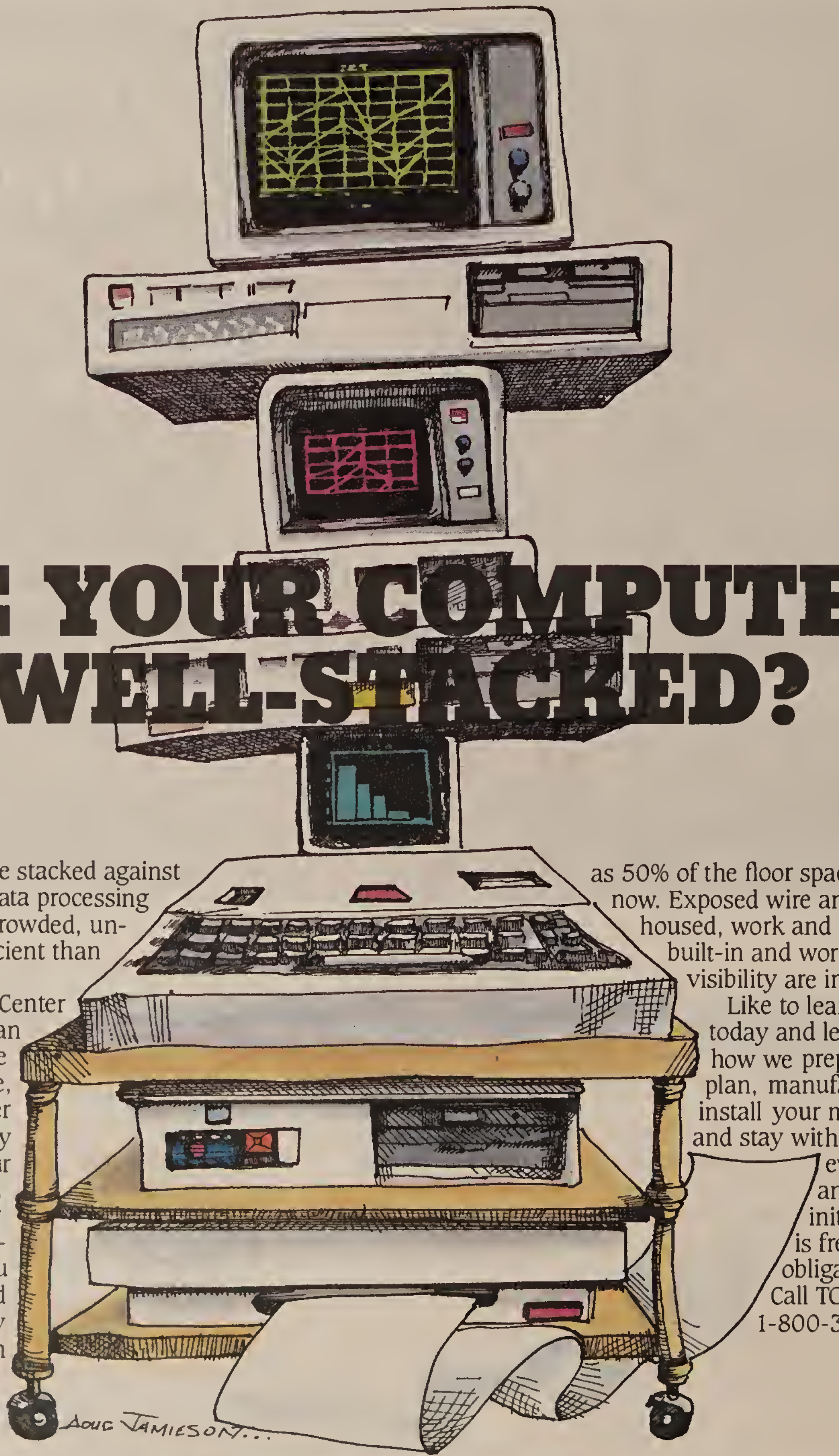
Richard Winter, CCA vice-president, said the PC version of Accolade Release 5.0 comes as a $7,500 option. The mainframe version is priced at $65,000 to $135,000, depending on operating system and options. Both will be available Dec. 1.

Release 5.0 allows a user to specify, generate, compile, test and interactively debug and execute CICS/VSAM applications on an IBM PC. The same applications can be run on mainframes using MVS and DOS/VSE at both specification and source code levels, Winter said.

Release 5.0 includes a dictionary link that allows Accolade applications to use data definitions stored in a Model 204 dictionary, according to Winter.

In addition, Release 5.0 features an SQL interface for accessing IBM's relational data base management systems, DB2 and SQL/DS.

ARE YOUR COMPUTERS WELL-STACKED?



If not, the odds are stacked against you because your data processing area may be overcrowded, unprotected and less efficient than it could be.

With Command Center Technology,™ we can change all that. We've designed these single, double and triple-tier modules for every type of console. Our exclusive designs, customized for your data processing operation, will give you more control and greater efficiency while saving as much as 50% of the floor space you use now. Exposed wire and cable are neatly housed, work and storage spaces are built-in and work flow and visibility are instantly increased.

Like to learn more? Call today and let us tell you how we prepare a detailed plan, manufacture and install your modules, and stay with you until everything is up and running. The initial consultation is free and there's no obligation.

Call TOLL-FREE
1-800-367-4361.

Command Center Technology™ by
INFRA-STRUCTURES, INC.
171 Rodeo Drive, Brentwood, NY 11717

We put data processing in its place.

World Digest

Sony exits UK

LONDON — Sony Corp. has pulled out of the UK microcomputer market, even before its new SMC 210 system began shipping. The company has cancelled all marketing plans, blaming the value of the British pound against the Japanese yen, and "the ever downward spiral of market prices."

The conditions, according to a Sony spokeswoman, "have forced us to the conclusion that the basic personal computer market does not represent a profitable activity either for Sony or its dealers."

But sources close to Sony feel that the company's withdrawal is not a permanent one. The cancellation of its plans have been put down to supply problems in Japan rather than concern over UK prospects.

The company's spokeswoman said she could not comment on the machine's future in overseas markets.

The company's reluctance is also thought to be tied to recent market development reports. Sony is facing a market that has quickly become dominated by Toshiba Ltd.

Sony plans to concentrate future efforts on existing micro-based product lines, such as interactive video and office automation products, according to a spokesman.

DEC smiles on sub

MUNICH, West Germany — Following a 20% growth in its West German sales, Digital Equipment Corp. is injecting $22.5 million into its West German subsidiary, thereby increasing its capital stock in the firm to $42.5 million.

British force upped

READING, England — Digital Equipment Corp. will add 970 new jobs to its British facilities by the middle of next year, bringing its total work force here to around 6,700 by June.

The job additions will be primarily in the areas of sales, field service and software engineering, a spokesman said.

The company's UK headquarters here will gain 400 employees and another 160 will be recruited for DEC offices in Basingstoke. The London facilities and the plant in Ayr will both increase by 100 people.

Philippine project

SEOUL, South Korea — Daewoo Telecom Co., a subsidiary of The Daewoo Group, has signed a $24 million deal with the Philippine government to supply TDX-1 digital telephone switching equipment.

The agreement calls for Daewoo to install the equipment, which will total 40,000 subscriber telephone lines, over a two-year period.

ICL lands contract

LONDON — International Computers Ltd. (ICL) has beaten IBM to a local government contract right on Big Blue's British doorstep. ICL recently won the hardware and software contract from Winchester City Council amid fierce competition from both IBM and Honeywell, Inc.

IBM's laboratories are based in the area, and several IBM employees sit on the town council.

IBM local councilors were forced by local legal requirements to declare an interest and leave the council chamber when the vote on suppliers was taken.

The council currently runs a Honeywell DPS 6 minicomputer for office automation applications and has an agency agreement with Hampshire County Council to run applications on the county council's IBM mainframe. Winchester has opted for an ICL Series 39 Level 30 mainframe running ICL's Quick Build.

Compiled from the CW Communications International News Service.

Javelin price slashed

By David Bright

CAMBRIDGE, Mass. — In a drastic bid for increased marketing presence, Javelin Software Corp. last week temporarily slashed the price of its Javelin financial planning and reporting package from $695 to $99.95.

The promotion will end as soon as 10,000 packages are sold at the lower price, said Dick Bonzagni, Javelin's marketing vice-president. Since Javelin started shipping the financial package a year ago, only about 15,000 units have been sold, Bonzagni said.

While claiming that the highly rated software program has gained many "zealous" users, Bonzagni acknowledged that Javelin faces an uphill battle in building public awareness of the software. "We're caught in somewhat of an inertia bind. We have to break through and get some critical mass," he declared.

Although Javelin's bold move will help the package gain momentum, it will still be difficult to make inroads against Lotus Development Corp.'s best-selling 1-2-3, noted Bonnie Digrius, director of software research at Input, a Mountain View, Calif., market research company.

Bonzagni contended that Javelin is by no means meant to be a replacement for spreadsheets; rather, it is a tool for specific applications such as forecasting and ad hoc analysis. In fact, most Javelin users already own spreadsheets, he said. But although the target audiences for 1-2-3 and Javelin may not be identical, most users do not want two packages, Digrius said.

Claiming it had expanded direct sales costs too quickly, Javelin last August laid off approximately one third of its three dozen employees. The 3½-year-old company is backed by more than $4 million in private funds.

BUILDING A COMPUTER CENTER?

If you're planning a new, expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to consultation on the smallest project, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, consultants, planners and builders specializing in computer facilities.

Datasphere's engineers are expert in all computer support systems including:

- *Uninterruptible Power Systems*
- *Computer Power Centers*
- *Computer Fire Protection Systems*
- *Computer Type Air Conditioning*
- *Gas Turbines/Diesel Generators*
- *Operation Command Centers*
- *Elevated Flooring*
- *Frequency Converters*
- *Line Filters*
- *Security Systems*
- *Systems Monitors*
- *Voltage Regulators*

CALL DATASPHERE

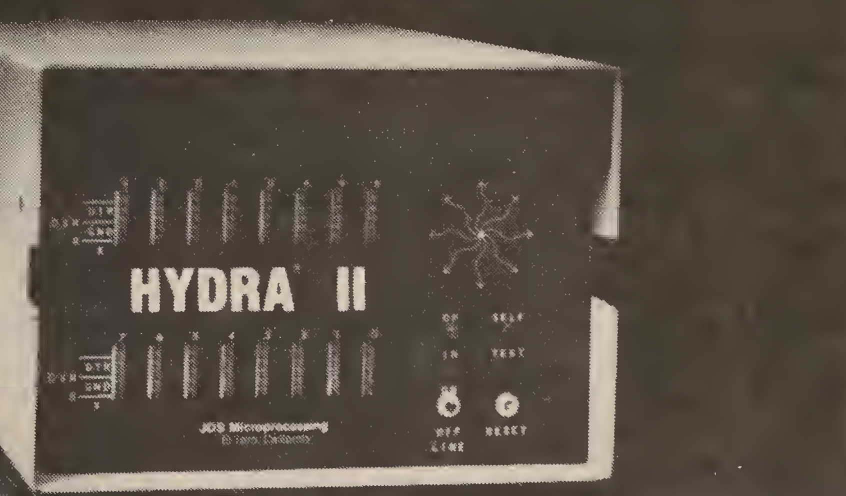
800-221-0575

IN NEW JERSEY CALL: 201-382-2300

datasphere, Inc. *1255 Westfield Avenue, Clark, New Jersey 07066*

The HYDRA® Connection

Your ASCII Access To Mainframe Power



Direct Channel Attached Protocol Converter/Controller

Terminal Emulation Connect inexpensive ASCII terminals or PCs that appear as 3270-type devices to host. HYDRA's enhanced interactive and functional capabilities include key-ahead (unlocked keyboard), user-defined keystroke sequences, and quick screen updating (redundant data suppression).

No 3705, front end or additional controller of any kind required.

Printer Emulation Attach any serial ASCII printer, including laser printers, letter quality or dot matrix printers and emulate 1403/3211 system printers or 328X type printers.

Variety of Devices HYDRAs flexibility enables virtually any ASCII RS-232 device to be supported. Plotters, bar code readers and document scanners can all be supported.

IBM Connection HYDRA is compatible with standard IBM operating system and application software. It attaches directly to the multiplexor channel of IBM 360/370/43XX/30XX or compatible mainframes.

File Transfer PC/Host file transfer with several powerful mainframe packages.

No remote software required on host - all devices appear local.

Adaptable Direct connect or communicate from your home, office or anywhere around the world using dial-up or leased lines. HYDRA's security features programmable log off, password and call-back protection.

Upgrade from 8 to 64 ports as your needs grow. Available in table-top or rack mountable units. Quick to install and easy to configure.

CALL TODAY! 800-55-HYDRA In CAL (714) 770-2263
For full details and your closest HYDRA dealer.

IBM is a trademark of International Business Machines

JDS MICROPROCESSING
22661 Lambert Street, Suite 206, El Toro, CA 92630

VIEWPOINT

EDITORIAL

Let buyers beware

Last week the MIS community read yet another chapter in IBM's year-long tale of financial woe: Third-quarter results fell nearly 30%, making it likely that the world's largest computer maker will show a drop for all of 1986 and thus, for the first time in over half a century, show two successive years of earnings declines.

Some argue that this is one more bit of evidence that we are in the early stages of a historic transformation in the computer industry itself, one which will result in computers-as-commodities and an industry that resembles today's consumer electronics business.

Not surprisingly, IBM instead blames its fate on external factors — among them a slowing global economy, sluggish capital spending and increased industry competition — and looks to the second half of 1987 for relief.

But right now, before either of these contentions can be proven true, IBM must deal with a dramatic turnabout in its fortunes. The question now before MIS is how IBM's current efforts to cope with its lowered expectations will affect computer-using organizations.

Will this dominant company become more stable or less so? Will its efforts to cope with an increasingly competitive market lead to greater leverage for buyers or to greater risk, as product cycles set in motion several years ago are significantly changed or disrupted?

Clearly, pressures on IBM to increase revenue will result in at least short-term advantages for computer users — at minimum, in negotiating more favorable terms in acquisition agreements. Also likely are improved hardware price/performance ratios. According to industry scuttlebutt, an announcement is imminent on a tune-up within the 3090 family. Such improvements — if easily accomplished with existing machines — would do no damage to IBM's installed base, while it would provide users with the clear differentiation they have been seeking between the 3090 and the older 3080 family.

Just as clearly, however, those same revenue pressures could work against the best interests of users, should they push IBM into rushing new products to market — products that may be ill-conceived, underdesigned and inadequately tested. Already there are rumors of quick additions to the 3090 family — above the four-CPU Model 400.

While MIS must be quick to push its short-term advantage in a competitive marketplace, it must also be quick to reject efforts — IBM's or anyone else's — to gain market share at the expense of healthy, long-term product development. MIS must be vigilant in its efforts to guarantee that IBM and its competitors do not sacrifice performance, reliability and deliverability for a short-term gain. The advice of the moment, therefore: Proceed, but with caution.

LETTERS TO THE EDITOR

Use existing AI systems for the PC

In response to your recent editorial, "The next revolution" [CW, Sept. 15], I cannot help but fully agree with your assertion that artificial intelligence has a vital role in business and commercial applications.

However, where you extol MIS professionals to apply pressure for artificial intelligence systems development based upon tried high-level languages, such as Cobol, I would strongly recommend the use of existing products. Waiting for a Cobol-based inference engine to come on the market will put the MIS manager far behind those who turn to currently obtainable products for the personal computer.

Artificial intelligence packages are already available for building expert knowledge systems with natural language interfaces that are coupled with the familiar tools of data base, spreadsheet, report generator and text editor.

Foremost among these trendsetting software applications is Micro Data Base Systems, Inc.'s Guru, a fully integrated package that has all the usual tools of automated business management plus such artificial intelligence features as data base, spreadsheet, text editor, graphics, report generator, command language, telecommunications, natural language and expert knowledge systems.

It is very similar to Knowledgeman, with identical file structure and corresponding menus. Guru's inference engine supports backward and forward chaining, displays how and why it arrived at a particular recommendation and is capable of accessing information from any other subsystem, whether program file, data base or spreadsheet. The menu-driven interface permits the novice knowledge engineer to quickly design rule sets and begin using artificial intelligence productively.

There are other products available: Quick Start by Teknowledge, Inc. and Impact/AE by Distribution Management Systems, Inc. I have yet to see these products and cannot offer an opinion.

When Impact/AE becomes available for the IBM Personal Computer next year, a Cobol-based expert knowledge system for microcomputers will be a reality. Those of us using Guru, however, will have had a full year of applications development experience.

Karl Horak, Ph.D.
Computer Consultant
Albuquerque, N.M.

Cullinet on departmental computing

Your recent article, "Vendors take opposing tacks to departmental computing" [CW, Sept. 29], may have left an incorrect impression regarding Cullinet Software, Inc.'s strategy for support of departmental computing.

While attention has recently focused on our announcement of support for Digital Equipment Corp.'s VAX architecture, we are committed to delivering cooperative processing software horizontally across, and vertically between, mainframes, minicomputers and microcomputers. Vertical cooperative processing can be seen in the micro-to-mainframe and mini-to-mainframe products we offer today. Horizontal processing will be offered through the distributed data base products to which we committed in our Blueprint briefing.

Robert E. Barr
Director of Product Marketing
Cullinet Software, Inc.

While we are certainly pleased to have our new departmental computing strategy noted by your Sept. 29 report, it is inaccurate to view our Digital Equipment Corp. VAX thrust as being at odds with the unfolding scenario of networked personal computers linked to the corporate mainframe. Cullinet has an established and successful PC-to-mainframe business. In fact, we are substantially upping our investment in this arena as we are rolling out the VAX strategy. We believe the departmental machine, specifically the VAX, will be the cornerstone of departmental computing. We also believe that end users need PC-based access to data stored on larger computers and the means to analyze and report on that data from PCs.

Stephen B. Sayre
Director of End-User Products
Cullinet Software, Inc.

Computerworld welcomes letters and publishes those it judges of greatest interest to its readers.

Preference will be given to typed, double-spaced letters of fewer than 150 words.

*Letters become the property of **Computerworld** and may be edited for the purposes of clarity and brevity.*

*Letters should be addressed to the Editor, **Computerworld**, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.*

VIEWPOINT

Avoiding risky business: Software buyer, know thy needs

By EFREM MALLACH

Two investors recently bought a software firm. They soon discovered, with 50 customers signed up, that its vaunted new product existed largely in the minds of the firm's managers. These managers, meanwhile, were looking for new jobs as fast as they could.

When asked why they didn't speak to any of their customers, their answer was simple: It wouldn't have done any good. The product was scheduled to ship shortly after the deal was closed. Before that time, what would customers say, "We don't have it yet, but we didn't expect to have it yet and it looks good on paper"?

Why didn't they check test sites? There were none. Not good practice, but not unheard of in small firms. They planned to "limit early shipments to a rate where we can get the bugs out." The customers at the head of the list knew the score in this respect.

The new goodies

What about demos? They saw one. The functions that had also been in the firm's earlier products worked. The menus listed the new goodies. Since the investors didn't know what was new and what wasn't, much of what they (and their consultants) tried worked. The few times something wasn't there, they were put off with, "We're replacing that module" or "It's scheduled for next week's integration step."

So far, we have two investors who are out a bunch of money. In this case, they can afford it. But the issues run deeper. If two hard-nosed businessmen can be duped, what about the rest of us?

First the bad news. We are all "vaporware" targets. Most vaporware does not arise out of malice; it arises from optimism. Typical developer states of mind include "It will work by then," "It's a trivial data structure," or "I can code it in a week if anybody orders it." Ha. Rome wasn't built in a day. Neither is ROM or RAM. Most products do work sooner or later. Usually later. Sometimes much later.

This being the case, what should you do? Caspar Milquetoast would give you one answer: Don't go near anything less than three years old without speaking to a hundred happy users. Fine advice if you wear a belt plus two pairs of suspenders and don't leave the house when it's raining. But some of us do need current products.

Software Buyers Anonymous

The first step you should take is to analyze your real needs in the cold light of day. Why do you want the new gizmo? To be the first kid on the block with a new toy? Because of a glib sales pitch? Or because the product will really do your organization some good and achieve some result that can't be achieved as well in any other way? If it's any reason but the last, call Software Buyers Anonymous. Someone will come over and talk to you until the urge to buy software goes away.

Next, look at the risk of using the product. A personal computer slide-making program may cost $150. If it's a dud, you're out $150 plus the time someone wasted in finding out it's a dud. But your corporate data base is still intact, no customer orders have been lost and nobody has been laid off because the package lost a digit in net profits. When your vulnerability is small, take chances. When its large, you have to be careful.

Being careful is largely a matter of common sense. If a package has been delivered — even to test sites — talk to users. Ask rough questions. Use the package as much as you can under the conditions. Don't take no for an answer from the sales rep; make it clear that yes is a condition of purchase. While you may not want to do without the benefits of a new capability, you do want to avoid the problems defective software can create.

If a package has not yet been delivered, ask yourself (not the vendor) where it ought to be in its development for commitments to be met. If a builder promises you a house for occupancy in two months, you expect to see some construction at the site. If occupancy is to be in two weeks, the house should be complete except for paint and trim.

It's the same with software. Based on your assessment of what its state ought to be, get proof that it has reached that point or better. "Proof" means just that. If you don't think you're capable of assessing the software yourself, get someone who is. (The investors of the first paragraph failed this test. Their consultant was a financial type with a background in the industry the software firm served. He did not have the technical background to see through the misrepresentations.)

Murphy's Law

A package may fail these tests and still be desirable because of its potential value. Or it may pass them and still not do what you expect when you expect it. Your final protection is to ask, "What can go wrong?" Murphy's Law will apply. Protect yourself by planning what you will do if a new package fails to perform as expected. View these contingency and backup plans as an insurance policy that you hope you won't need but still won't go without.

Bottom line: There is a time to buy new software packages. Were there not, no new company could ever get started. But, as a manager whose responsibility is to your employer, use new software with care. Taking a few intelligent precautions will give you the benefits of state-of-the-art software with little exposure to vaporware.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

How desktop publishing went from accident to application

GUEST OPINION

By MICHAEL A. CONNIFF

As the designated mop-up speaker at the recent "Electronic Publishing" show in London, I was faced with the thankless task of uncovering synergy among disparate industries and technologies, from desktop and corporate electronic publishing to compact-disc/read-only memory (CD-ROM) and compact disc interactive (CDI).

Since consultants are not paid to stammer, our genetic tendency is to come up with an answer. This, then, was my answer to the question of how to "bring it all together:"

- The basic principle of digital integration — the integration of voice, video, graphics, text and data is the fundamental driving force in electronic services today and will remain so far into the future.
- The simultaneous arrival of CD-ROM and electronic desktop publishing is a harbinger of the multimedia desktop workstation to come — the ultimate end-user communications and computing tool.
- This trend toward digital integration has reached its first manifestation in an unlikely consumer electronics "appliance" known as compact disk interactive.

Let's take it from the desktop and follow the logic. Just as CD-ROM and CDI grew out of the success of compact-disk audio, so too has desktop publishing grown out of raw technical capability — on the front-end and the backside. When the Xerox Corp. designers at the Palo Alto Research Center (PARC) came up with the idea of a user-friendly mouse and icons, bit-mapped graphics, pointers and the like, desktop publishing was unknown. The improved PARC bit-mapped front end — the possibility that meaningful graphics could be harnessed by nontechnical users — was the first synergistic eye-opener in this scenario.

On the back end — the output side — while the Xerox developers worked on technology that would first be made commercially manifest as the Xerox Star system, and then the Apple Computer, Inc. Macintosh, laser-printing technology was beginning to emerge. The availability of an affordable Star-like Macintosh workstation and laser printer opened the door to desktop publishing.

So desktop publishing — a workstation or personal computer plus software and laser printer output — became an application that harnessed the enhanced bit-mapped graphics of Xerox and Macintosh computers and the ability of laser printers to elegantly produce the result on paper. Desktop publishing, almost by accident, emerged as an application.

Amidst the hubbub of Apple's print advertising blitz extolling desktop publishing, the importance of another force was largely missed. The advent of the Macintosh and desktop publishing meant that average users — not multidegreed Computer-Aided Design/Computer-Aided Manufacturing rocket scientists — were in a multimedia environment for the first time.

This development meant that users were now given widespread opportunity to consider graphics as information. It was a breakaway from the information society's nearly total dependence on text, on the word printed or transmitted.

The simultaneous arrival of laser printers meant users of these friendly workstations also had a warm, friendly and high-quality output — paper, an end-product you can hold in your hands — which could be cost-justified as a better and cheaper way to accomplish internal tasks.

There are many other examples of multimedia data bases and information services expanding beyond raw text. The Compaq Computer Corp. Telecomputer and the Northern Telecom, Inc. Displayphone are early examples of computer/telephone workstations that may yet become commonplace. Datapoint has integrated video teleconferencing into some of their distributed data processing products.

Compact disk interactive, in primitive fashion, pushes multimedia integration a step further. As specified by Sony Corp. and Philips Telecommunications N.V., the CDI standard provides for audio, still-frame video, graphics, some limited animation, text and data. The different media have been reduced to a common digital coding, though the implications remain more evident than the precise shape of applications to come. CD-ROM applications are also moving toward multimedia applications, using the laser printer for output.

It is no longer foolish to consider the manager of the future at a multimedia desktop workstation, utilizing all the media in the course of daily business — audiotex services, on-line data bases, video teleconferences, stored graphic images on CD-ROM, perhaps output to a laser printer — and the plain old phone.

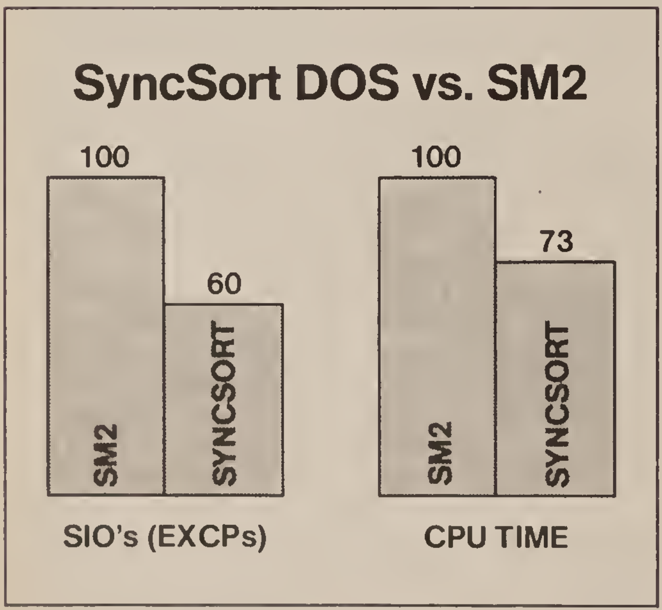
Conniff is a consultant and writer based in Burlington, Vt.

SMART COOKIE

Like you, SyncSort DOS is cut from a special mold.

Call (201) 930-9700.

It's healthy for your system.



syncsort INC.

One thing about smart cookies, they can spot each other a mile away.

While they don't flaunt their derring-do, they quietly know they're the best at what they do. Because substance shows through. Every time.

Especially when the going gets tough. And rough. As it often does in a DOS environment.

For example, a smart cookie doesn't crumble under the pressure of too many programs and too few programmers.

A smart cookie doesn't waste dough — but picks and chooses the right ingredient to keep production on the rise.

And sometimes, even, a smart cookie has to be a mighty tough cookie. That means being on the job constantly. Keeping things running and humming. Without draining vital resources.

All of which brings us to our smart cookie: SyncSort DOS. A cut above the rest if you ever saw one. Check these delicious advantages.

BETTER PERFORMANCE

Pop one into your system and you'll see a mouthwatering difference. Immediately. SyncSort DOS will give you performance improvements like those shown in the chart on the left.

And performance features such as:

- **Automatic Secondary Allocation** — With this feature your sorts will never run out of disk space, i.e., no "sort capacity exceeded" messages.

BETTER FEATURES TO IMPROVE PROGRAMMER PRODUCTIVITY

As you begin to digest SyncSort DOS, you'll find it more and more to your liking. With ingredients that cut down to size the amount of programming time going into applications.

- **SortWriter** — A powerful tool that can produce extensive reports as a by-product of your normal sorting — without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
- **Record Formatting** — Powerful features like INCLUDE/OMIT, INREC/OUTREC, SUM and others — with capabilities like data conversion, editing, insertion of literals.
- **Multiple Output** — From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

BETTER CUSTOMER SERVICE

Still another sweet advantage of SyncSort DOS: help is always there when you need it. 85% of all requests for service are resolved within 24 hours. We always rise to the occasion.

The moral to this story: smart cookies are quick to reject half-baked solutions in favor of SyncSort DOS. Call us for a demonstration. Once you get a taste you will be hungry for more.

SyncSort DOS
One smart cookie deserves another.

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675

SOFTWARE & SERVICES

SOFTALK
Roger Thimbault

Those busy signal blues

The problems with computer software support are so tremendous that *Time* magazine devoted nearly a full-page article to the situation — "The Busy Signal Predicament" — recently.

The computer support problem has two major fronts — the frustrated users with questions for the manufacturers about their products, and the costliness of the user support given by the software manufacturers. Both the users and the manufacturers have valid arguments in their defense.

The users keep running into busy phone lines when trying to contact the software manufacturers for free advice via the toll-free assistance lines. And it's not just on the first or second call. The lines seem to be busy from 9 a.m. to 5 p.m., after which the phone machines will gladly answer any calls.

There are various avenues open to a user to get around these problems; however, as with most things in life, they're not free. Users can subscribe to an assortment of service contracts complete with unlisted help line numbers. The services are offered by both software manufacturers and third-party consultants. Typical fees for such services are generally less than $100 per year.

Software manufacturers and vendors are often criticized by users for their lack of an adequate number of professionals to assist them when problems arise with their software. Yet the manufacturers often have valid reasons for the way they deal with their customers' problems. The bottom line is money once again.

The software industry spends hun-

See **THOSE** page 21

Thimbault is the publisher of "AI Today," a newsletter launched at the August conference of the American Association for Artificial Intelligence in Philadelphia. He is based in Elkview, W. Va.

IBM adds high-tech VM

System software aimed at technically advanced users

By Rosemary Hamilton

WHITE PLAINS, N.Y. — Along with the recent release of its VM/SP operating system, IBM announced a number of VM-related software offerings, including a version of VM/SP targeted at technically advanced users.

VM/SP System Offering, which is scheduled for availability in the second quarter of next year, is based on VM/SP Release 5 and will be offered as a package with application programs. Users can select from more than 60 programs and will receive both the operating system and their programs on the same tape, an IBM spokesman said.

The packaged VM/SP concept was also offered for entry-level users this month with IBM's introduction of VM/IS.

"VM/SP System Offering is for our larger customers or those with advanced technical skills," an IBM spokesman said.

Pricing for VM/SP System Offering depends on a user's choice of application programs. The operating system component price ranges from a one-time charge of $7,740 for a small processor to $30,950 for a high-end mainframe.

Complimenting the VM/SP Release 5 operating system are the following software programs:

- Resource Access Control Facility (RACF) for the VM/SP environment will be available at a monthly cost of $695 in December. Currently, users are required to purchase two software packages to run the system security program under VM/SP — the RACF Version 1 Release 7 program and RACF/VM Support PRPO. Combined, the two programs had a monthly charge of $1,108.

With this announcement, the vendor

See **IBM** page 23

SOFTWARE NOTES

Rabbit Software to provide IBM link

IBM has selected **Rabbit Software Corp.** of Malvern, Pa., to provide 3270 and remote job-entry host communications for its RT Personal Computer. IBM will sell Rabbit's 3270-Plus and RJE-Plus micro-to-mainframe emulation packages. 3270-Plus includes a host programming interface that permits users to write applications for the RT PC that can interact with host applications.

•

Cummins Engine Co., a manufacturer of diesel engines and truck equipment, has invested $1 million in **Aries Technology, Inc.** of Lowell, Mass., as it attempts to bring to market the Conceptstation, a computer-assisted mechanical engineering design aid.

According to Cummins officials, the firm wants to use the product in the development of new products. Other investors include Alex. Brown & Sons, Edelson Technology Partners and Citicorp Investment Management.

See **NOTES** page 23

On-Line rebids E-mail in CICS

By Alan Alper

FORT LEE, N.J. — On-Line Software International, Inc., in a renewed effort to crack the electronic mail market, has unveiled a message processing system that runs in the CICS environment.

Called Bulletin, the system enables users to create and distribute memos, forms, reports and other documents on IBM 3270 terminals and microcomputers. The system can be used on IBM 370-family mainframes and compatible computers running a CICS environment under DOS or MVS operating systems, On-Line Software representatives said.

Bulletin is On-Line Software's second foray into the E-mail business. The firm introduced its initial electronic mail system, Omnicom, about 3½ years ago. Omnicom was subsequently melded with its micro-to-mainframe product — Link — and marketed under the name Omnilink.

"We found that the two products were viewed as different applications, so we thought we'd start a new development effort and re-enter the market," noted John C. Crocker, On-Line Software's executive vice-president.

See **ON-LINE** page 23

INSIDE

IBM announces text-search capability for VM/CMS systems/**21**

NEW THIS WEEK

- Landmark Systems Corp. releases Version 6.2 of The Monitor for CICS
- For more on this and other new products, see pp. 95-114.

INSTANT ANALYSIS

"Ten years ago there were a lot of software companies shooting from the hip and some of them developed Achilles' heels. Many companies are certainly much more mature today."

— John Cullinane, chairman, Cullinet Software, Inc.

BIM Spotlight

Wouldn't it be nice to have a couple more terminals on your desk?

You could eliminate the inconvenience, lost productivity, and system overhead associated with logging off and on to different applications!

BIMWNDOW permits multiple terminal sessions to be active concurrently at the same physical 3270 CRT, under **DOS** or **OS** VTAM. The user may switch back and forth **instantly** between the terminal sessions by hitting a PA or PF key. The terminal sessions may be in the same or in different VTAM-connected partitions/regions. For example, one session might be logged on to a CICS partition or to TSO to do program editing, and another session connected to a test CICS to test the application program being developed.

Call for full documentation or **free 30-day trial.**

Price: OS - $4800 or $200/mo., DOS - $2400 or $120/mo.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

BIM
B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Telex 297 893 (BIM UR)
Member Independent Computer Consultants Assn

WHEN SUCCESS IS YOUR ONLY ALTERNATIVE...

CHOOSE THE COMPANY THAT ENGINEERS IT: **SOFTWARE AG**

The success of a corporation is increasingly dependent on its ability to satisfy the growing demands for accurate and timely information.

To ensure successful information management, Software AG has engineered a system that is both integrated and comprehensive. A system that integrates the functions of data communications, end user services, applications development, data base management, and the advantages of an automated office environment—without compromising performance.

In addition, Software AG protects your investment by providing environmental independence. Your applications become portable across multiple hardware and operating systems . . . while giving you the flexibility to grow and change over time.

Forming the foundation of this fourth generation technology are ADABAS, NATURAL, and PREDICT . . . the basis of successful information management for over 2200 clients—worldwide.

We're Software AG. For nearly two decades, we've been engineering success. Our clients experience it . . . our customer service teams support it . . . and our status as an international leader proves it.

Software AG. Because success is your *only* alternative.

ADABAS
EFFECTIVE DATA BASE MANAGEMENT

NATURAL
FOURTH GENERATION APPLICATIONS DEVELOPMENT

PREDICT
HIGH PRODUCTIVITY ACTIVE DICTIONARY

...AND MORE

SOFTWARE AG
PROGRAMMING BUSINESS SUCCESS

United States: Atlanta, Boston, Charlotte, Chicago, Cleveland, Dallas, Denver, Detroit, Ft. Lee (New Jersey), Houston, Kansas City, Los Angeles, Minneapolis, New York, Orlando, Philadelphia, Pittsburgh, St. Louis, San Francisco, Seattle, Washington, D.C. International: Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Hong Kong, Israel, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Panama, Singapore, Spain, Sweden, Switzerland, United Kingdom, Venezuela

IBM announces text search capability for VM/CMS systems

Text retrieval operates with no file conversion

WHITE PLAINS, N.Y. — A text search capability for VM/CMS customers has been announced by IBM as an enhancement to existing CMS text retrieval functions.

IBM spokesmen said Contextual Search/370, or CFSearch/370, is a full-text search facility that can look for any textual information, such as plain words, acronyms, variables in source programs, dates and numbers.

The search may be conducted across multiple CMS files without requiring any file conversion or content description. Information on users' minidisks may be accessed without identifying individual files.

The search is based on full-text indexing. The indices required for searching are created automatically. Any selection of files is possible, provided the record length of a file is less than 256K bytes, the announcement said.

The search may also be based on a national language.

Text analysis tables are provided for English, Spanish, French, Portuguese, Italian, German, Norwegian, Swedish, Danish and Finnish and include adaptations for Belgium, Brazil, Canada and Switzerland.

When needed, the search may be conducted by partial match retrieval and the use of Boolean logic (And, Or, Not) to combine search words. The system can also look for user-defined synonyms and display the modified request to the user before proceeding with the search.

CFSearch/370 is available immediately at a one-time charge of $6,500 or a monthly license of $295.

Those busy signal blues

From page 19

dreds of millions of dollars per year for customer support. The cost of customer support can be crippling. If one user makes more than two or three calls for assistance over the product's lifetime, then, in many cases, the manufacturer is paying for the customer to use the product.

Enter artificial intelligence. One way to minimize the assistance request calls is to literally furnish every software product sold with its own expert system troubleshooting software. This would be a half-step sideways and two steps up from the normal tutorials currently furnished with software programs.

Expert system technology is one branch of artificial intelligence that is reaping tremendous rewards from commercialization. Why not bring the technology into every home or business in the U.S. that uses personal computers, extending manufacturer support to the end-user site? The expert systems would be extremely easy to use and would require no previous computing exerience.

One alternative to this is to have a mainframe or minicomputer at the manufacturer's office with resident expert systems for all of the company's products. When a user has a question with a product, he would call the appropriate expert system.

For practical purposes, the computer would need to be able to incorporate speech processing as one of its features so that the dialogue would not necessarily have to involve any human counterparts at the company. Since commercial voice recognition products are not quite ready to handle such a feat, the prospects for such a system within the next year or two are rather bleak.

Perhaps on-line communications between customers and the manufacturer's troubleshooting expert systems will be the forerunners of speech processing devices.

Additional consequences from utilizing any of these expert system methods to assist the users include software that is initially slightly higher priced, increased profits for the software manufacturers and vendors and greater user satisfaction.

Representatives of one software manufacturer have told me their company is preparing to implement expert system troubleshooting technology in their line of products within the next year. Software users are certain to find themselves employing more expert system technology in future customer support operations.

Software Engineered for Simplicity
Elegant Software
for IBM S/36 & S/38 Computers
Elegant Software
J.D. Edwards & Company

Businessman's Perspective

It simplifies my business . . . it saves money . . . it gives me the information I need to run my business . . . it's adaptable . . . it does the job . . . what more could you ask?

An Accountant's Perspective

It's integrated . . . it's simple . . . it was designed by accountants for accountants . . . it's timely and well controlled . . . it's secure.

Data Processing Perspective

Superior quality . . . superbly documented . . . direct and easy to understand . . . truly state-of-the-art technology.

Packages for:

Financial
General Accounting
Accounts Payable
Accounts Receivable
Equipment and Fixed Assets
Financial Reporting
Planning & Budgeting
Payroll/Personnel

Distribution
Order Processing
Inventory Management
Sales Analysis
Purchasing

Construction
Job Cost Accounting
Multi-State, Union Payroll
Equipment Management

General
Computer Assisted Design
Computer Assisted Programming
JDE/Lotus® Interface

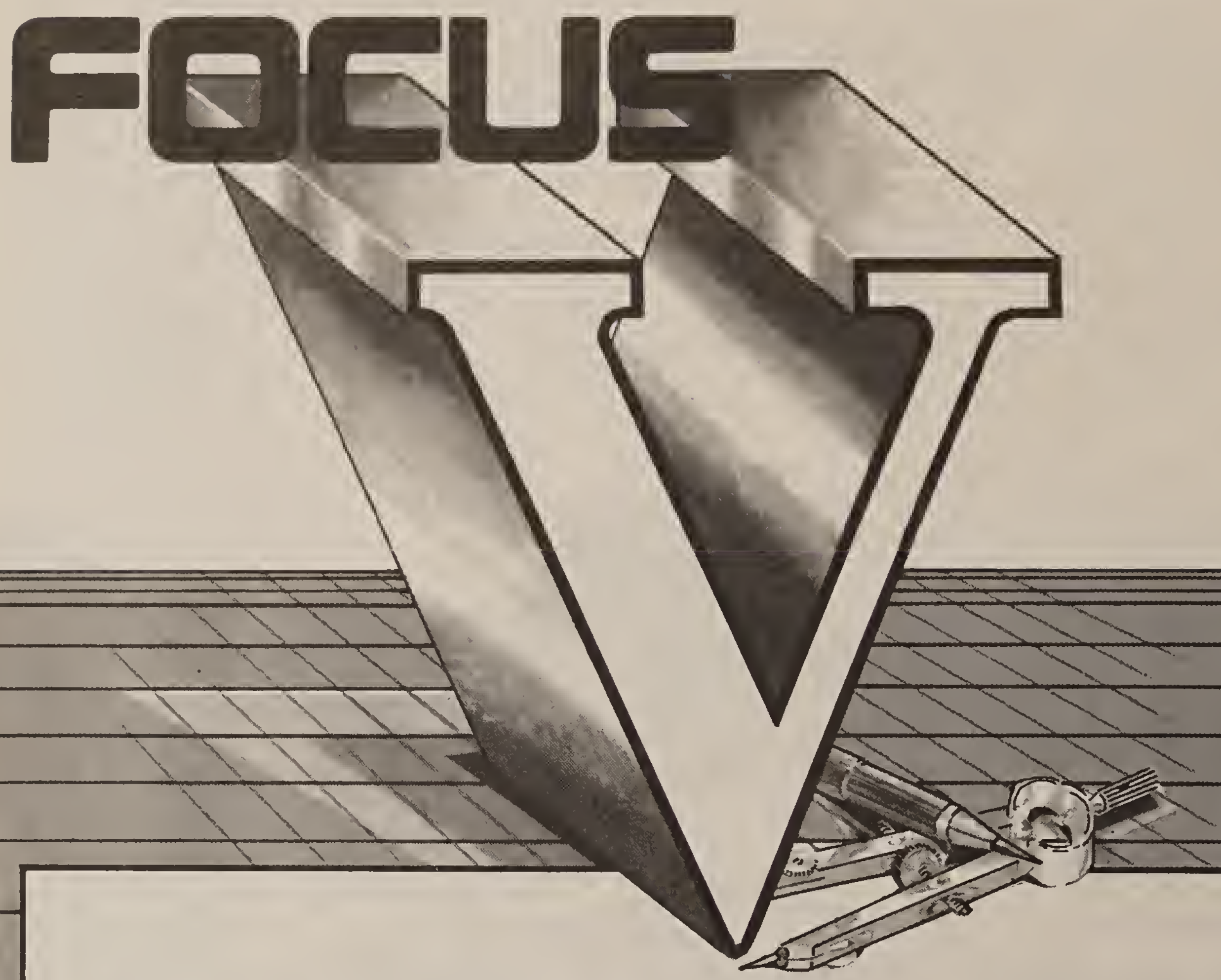
J.D. Edwards & Company

4949 South Syracuse Street / Suite 5500
Denver, CO 80237
303/ 773 3732

New York — 201/ 348 8989
Chicago — 312/ 571 6687
Dallas — 214/ 458 0636
Houston — 713/ 880 8278
San Francisco — 415/ 571 5755
Newport Beach — 714/ 955 0118

IBM® Value Added Remarketer

Introducing



We made FOCUS better, so you can build applications faster!

If the key to your success is applications development, Information Builders has improved FOCUS for you! By making the industry's leading Fourth Generation Language (4GL) and DBMS richer and more effective, we've achieved the following results:

- Improved Efficiency
- More Powerful Language
- New Development Tools
- Update Facilities for DB2 & VSAM
- New Decision Support Facilities
- New Technology

Free Seminar will Disclose Everything The New FOCUS V Can Do For You And Your Company!

Here you will gain an understanding of 4GLs in general as well as FOCUS 4GL in particular. Discover how FOCUS is used as a database/data management tool. Learn about its powerful relational and decision support facilities as well as its high-level transaction language. Watch the design and prototyping of a live database application! This seminar will clearly demonstrate how you can have the same benefits that over 300,000 FOCUS users currently enjoy:

- Reduced Applications Development Time
- Rapid Application Prototyping
- Successful End-User Computing
- Portability Of Applications
- Improved Timeliness Of Information.
- Improved Competitive Advantage For Your Company

Act now to register, seating will be limited. Call our Seminar Coordinator today at (212) 736-0842, or write to:

Seminar Coordinator
Information Builders, Inc.
1250 Broadway, New York, NY 10010

1986 Fall Seminar Agenda

8:30- 9:00	Registration and continental breakfast
9:00-10:00	FOCUS for Data Analysis Applications
10:30-10:45	Refreshment break
10:45-12:15	FOCUS for Database/Data Management Applications

1986 Fall Seminar Schedule

Atlanta, GA Tue Oct 14
Hyatt Ravinia, Atlanta
Austin, TX Wed Oct 22
Stephen F Austin Hotel, Austin
Baton Rouge, LA Tue Oct 14
Embassy Suites, Baton Rouge
Boston, MA Thu Nov 6
Boston Marriott, Newton
Charleston, WV Thu Oct 16
Charleston Marriott
Chicago, IL Tue Oct 28
Marriott Oak Brook, Oak Brook
Chicago, IL Thu Nov 6
Westin Hotel, Chicago
Cincinnati, OH Thu Oct 30
Hyatt Regency, Cincinnati
Cleveland, OH Thu Oct 23
Cleveland Airport Marriott
Danbury, CT Tue Oct 28
Danbury Hilton Inn
Detroit, MI Thu Oct 16
Michigan Inn, Southfield
Detroit, MI Tue Nov 18
Somerset Inn, Troy
Greensboro, NC Mon Oct 20
Greensboro High Point Marriott
Hartford, CT Thu Oct 9
Sheraton, Hartford
Honolulu, HI Thu Oct 9
Westin Ilikai, Waikiki
Houston, TX Thu Oct 9
Marriott West Loop, Houston
Indianapolis, IN Thu Oct 23
Hyatt Regency, Indianapolis
Kansas City, MO Thu Oct 16
Hyatt Regency, Kansas City
Knoxville, TN Thu Nov 6
Hyatt Regency, Knoxville
Long Island, NY Thu Nov 13
Sheraton, Smithtown
Los Angeles Area, CA Tue Oct 28
Sheraton at Universal City,
San Fernando Valley
Los Angeles Area, CA Thu Nov 6
Anaheim Hilton & Towers
Minneapolis/St. Paul, MN
Thu Oct 30
Minneapolis Plaza, Minneapolis
Morristown, NJ Tue Oct 28
Madison Hotel, Morristown
Nashville, TN Thu Oct 9
Nashville Marriott
New Orleans, LA Wed Oct 15
New Orleans Marriott
New York, NY Thu Oct 30
Vista International, New York
Omaha, NE Thu Nov 6
Red Lion Inn, Omaha
Orlando, FL Tue Nov 18
Hyatt Orlando, Kissimmee
Philadelphia, PA Wed Oct 15
Hershey Hotel, Philadelphia
Phoenix, AZ Tue Oct 21
Sheraton Scottsdale Resort
Portland, OR Tue Oct 21
Alexis Hotel, Portland
Richmond, VA Tue Oct 7
Richmond Marriott
Salt Lake City, UT Tue Nov 25
Salt Lake City Marriott
San Antonio, TX Tue Oct 21
Hyatt Regency Riverwalk, San Antonio
San Diego, CA Thu Oct 30
Sheraton Harbor Island West, San Diego
San Francisco, CA Thu Nov 20
Sheraton Palace Hotel, San Francisco
Seattle, WA Thu Oct 23
Four Seasons Olympic, Seattle
St. Louis, MO Thu Nov 13
Stouffer Concourse Hotel, St. Louis
Syracuse, NY Wed Oct 15
Syracuse Marriott
Tallahassee, FL Thu Oct 23
Tallahassee Hilton
Washington, DC Fri Oct 31
J W Marriott Hotel, Washington

CANADA

Calgary, AB Thu Oct 30
Skyline Hotel, Calgary
Montreal, PQ Wed Oct 15
Le Centre Sheraton, Montreal
Ottawa, ON Tue Oct 14
Westin Hotel, Ottawa
Toronto, ON Mon Nov 3
Holiday Inn, Toronto
Vancouver, BC Tue Oct 28
Westin Bayshore, Vancouver

IBM adds high-tech VM

From page 19

has merged the functions of the two programs into RACF Version 1 Release 7.1. Users who wish to obtain the security program prior to December can purchase the two separate packages. For this intermediate period, the RACF Version 1 Release 7 will be reduced to $695 per month from $841, bringing the total monthly charge to $962. The RACF/VM Support PRPO product will continue to sell for $267 before it is discontinued in December.

- The VM/Remote Spooling Communications Subsystem Networking Version 2 Release 2 is offered as a networking utility for both IBM's Systems Network Architecture (SNA) environments and non-SNA environments. With prices starting at $3,600, the program supports IBM's advanced-function printers, such as the 3800-3 and 3820. It also provides automatic link management, which allows the software to automatically answer an incoming call on a switched telecommunications line from a remote workstation or to automatically call a remote workstation.

For its entry-level VM/IS package, the vendor announced the VM/IS Productivity Facility Version 2, which reportedly offers a simplified user interface that "reduces the skill required by a system administrator to perform complex tasks," according to IBM.

The entry-level VM/IS package, which comes with a one-time charge ranging from $900 to $3600, is currently available.

Lovelace Award winner named

NOTES from page 19

Margaret Hamilton is this year's recipient of the Augusta Ada Lovelace Award for Excellence, awarded by the Association for Women in Computing. Hamilton, a mathematician, directed the 300-member software engineering team that created the on-board guidance and navigation software for the Apollo spacecraft program.

■

Quintus Computer Systems, Inc. of Mountain View, Calif., will develop a run-time version of its Prolog for IBM 370-family mainframes running VM and MVS. The effort results from an agreement with Language Technology, Inc., which will develop programs in Quintus's Prolog that will be compiled for use with the firm's run-time version on the 370 mainframes. The agreement marks the first commercial use of the artificial intelligence language in the IBM mainframe environment, spokesmen said.

■

Applix, Inc. and Digital Equipment Corp. have signed a cooperative marketing agreement for Applix's Alis office automation software running on Digital Equipment Corp.'s Ultrix-based workstations. Alis, a communications-based and graphics-based OA package, is available for Ultrix-based workstations for $2,495. It is already out for DEC VAXs running Ultrix.

On-Line rebids E-mail in CICS

From page 19

Among the major differences between On-Line Software's original and current E-mail systems are facilities in Bulletin that allow users to create personalized calendars and to schedule meetings electronically. The meeting scheduler will automatically check the calendar of the user and all other potential attendees to see whether a conflict exists.

If none do, it can schedule the meeting and ask other attendees to confirm their ability to attend. It can also reserve specified meeting resources, such as conference rooms or projectors, spokesmen said.

Two sign-on methods are provided — general user, under which an individual can sign on to any terminal and receive a message, and terminal, with which users can designate specific destinations. A confidentiality feature allows only the sender and recipient to view a message.

In addition, when users sign on, the system informs them of pending messages, events that need to be confirmed and the next event scheduled on the calander.

Bulletin, unlike its predecessor, is being offered with optional interfaces to IBM's Distributed Office Support System, available in the first quarter of 1987, and Professional Office System, due in November. A Bulletin-to-Bulletin interface, making use of IBM Systems Network Architecture LU6.2 functions for communication between remote CICS sites, will be available in the first quarter of 1987. Without the interface, Bulletin allows the exchange of electronic mail within one CICS environment, On-Line Software officials said.

Bulletin also accepts batch reports as input from other programs for transmission to electronic mailboxes.

Bulletin's introductory licensing fee is $19,000 (OS) and $14,000 (DOS) through Jan. 16. Thereafter, the licensing fees are $25,000 and $18,000, respectively.

The 150 companies already using On-Line Software's existing E-mail product will receive Bulletin at no extra charge as part of their maintenance fee, Crocker said.

"Bulletin holds up under high-volume usage," On-Line Software Vice-President Susan Luechinger said. "It can handle messages going to 2,000 to 3,000 destinations at once."

Disk storage, with an average industry growth rate of 40 percent a year*, is the fastest growing component of most IBM mainframe installations. And, personnel costs to manage disk storage are rising rapidly as well. The ASM2 Automated Storage Management software curbs expensive DASD growth and allows you to gain control of this valuable asset.

The benefits of ASM2 software are readily apparent. A 25 percent increase in available DASD space is commonplace for a new ASM2 user. More importantly, ASM2 software enables users to add DASD without adding people to manage it.

ASM2 software improves your overall data center performance in archiving, restoring, backing up and migrating data ... automatically. It offers a comprehensive set of DASD management tools that let you enforce individual storage management standards, and determine your own customized report formats. All with simple user interfaces.

ASM2 software further improves data center efficiency through its data restoration facility, IXR (Intelligent Transparent Restore). With IXR, you'll never again have to pre-check data set availability, or issue manual restore requests. What's more, its unique look-ahead ability allows for more data to be archived and retrieved than ever before.

Easy to use and administer, ASM2 software is recognized by over 800 users worldwide as the standard in high-performance storage management. That's partly because of the immediate bottom-line benefits users realize by automating storage management, also because ASM2 software has been constantly enhanced since its introduction in 1974.

ASM2 software helps solve today's storage management problems *today.* And positions you to meet and manage future DASD requirements in the evolving IBM operating systems environment.

For additional information on ASM2 software, contact Shawn McLaren today, at 1333 Lawrence Expressway, Santa Clara, CA 95051-3595; (415) 941-4558; Telex 357437.

ASM2 is a trademark of The Cambridge Systems Group.
*Based on International Data Corp. study.

The Cambridge Systems Group

Over a decade of strategic software solutions.

ASM2™ storage management software. Your bridge to the future.

THE SAS®
Fourth Generation Software

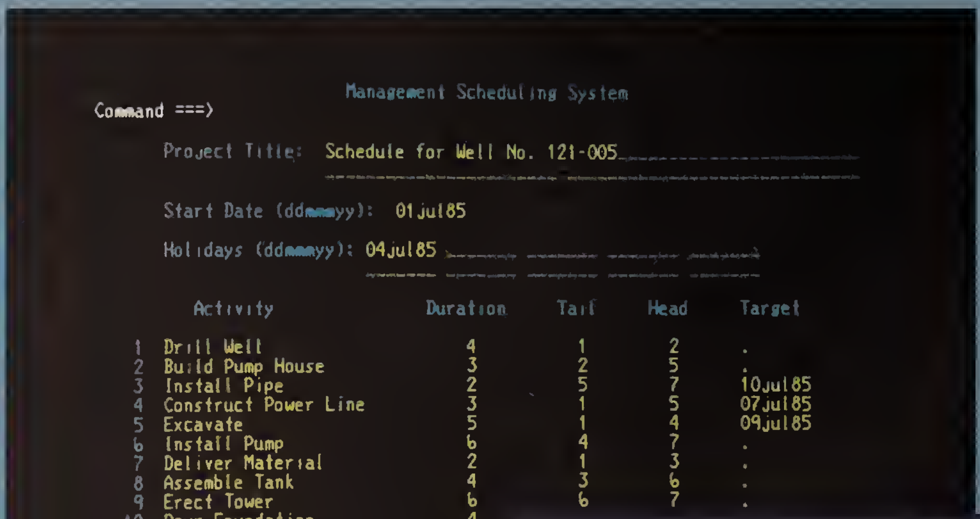
Now there's one software solution for all your Information Center needs. One solution for all your applications, for all your mainframes, minicomputers, and microcomputers. One solution—the SAS® System.

One Solution to Integrate All Your Computing Tasks.

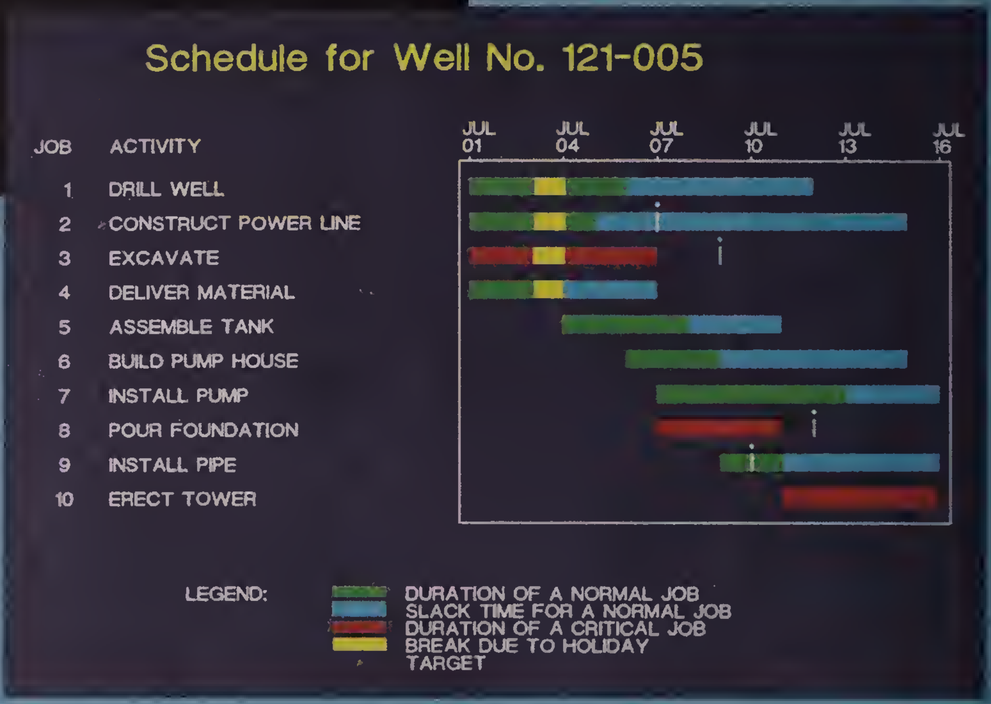
The SAS System gives you efficient data management, superior statistical tools, an easy report generator, customized presentation graphics, and more. Choose between the simple English-like command language or a front-end menuing system with fill-in-the-blank screens. On-line help facilities make it easy to handle every application, quickly and accurately.

You can track sales leads, manage prospect files, determine market share, and present results with the SAS System. Plus you can file employee and applicant records, analyze benefit programs, and manage the payroll. The SAS System can handle all your accounting applications, and produce spreadsheet reports automatically.

That's not all. With the SAS System, you can take orders, keep inventory, and produce mass mailings. Schedule projects, determine product mix, and make forecasts. Your DP staff can measure hard-



```
                         Management Scheduling System
Command ===>

     Project Title:  Schedule for Well No. 121-005____________________

     Start Date (ddmmmyy):   01jul85

     Holidays (ddmmmyy): 04jul85 _______ _______ _______ _______

       Activity                  Duration    Tail    Head    Target

  1  Drill Well                     4         1       2       .
  2  Build Pump House               3         2       5       .
  3  Install Pipe                   2         5       7      10jul85
  4  Construct Power Line           3         1       5      07jul85
  5  Excavate                       5         1       4      09jul85
  6  Install Pump                   6         4       7       .
  7  Deliver Material               2         1       3       .
  8  Assemble Tank                  4         3       6       .
  9  Erect Tower                    6         6       7       .
 10  Pour Foundation                4
 11  ____________________          ___
 12  ____________________          ___
 13  ____________________          ___
 14  ____________________          ___
 15  ____________________          ___
```

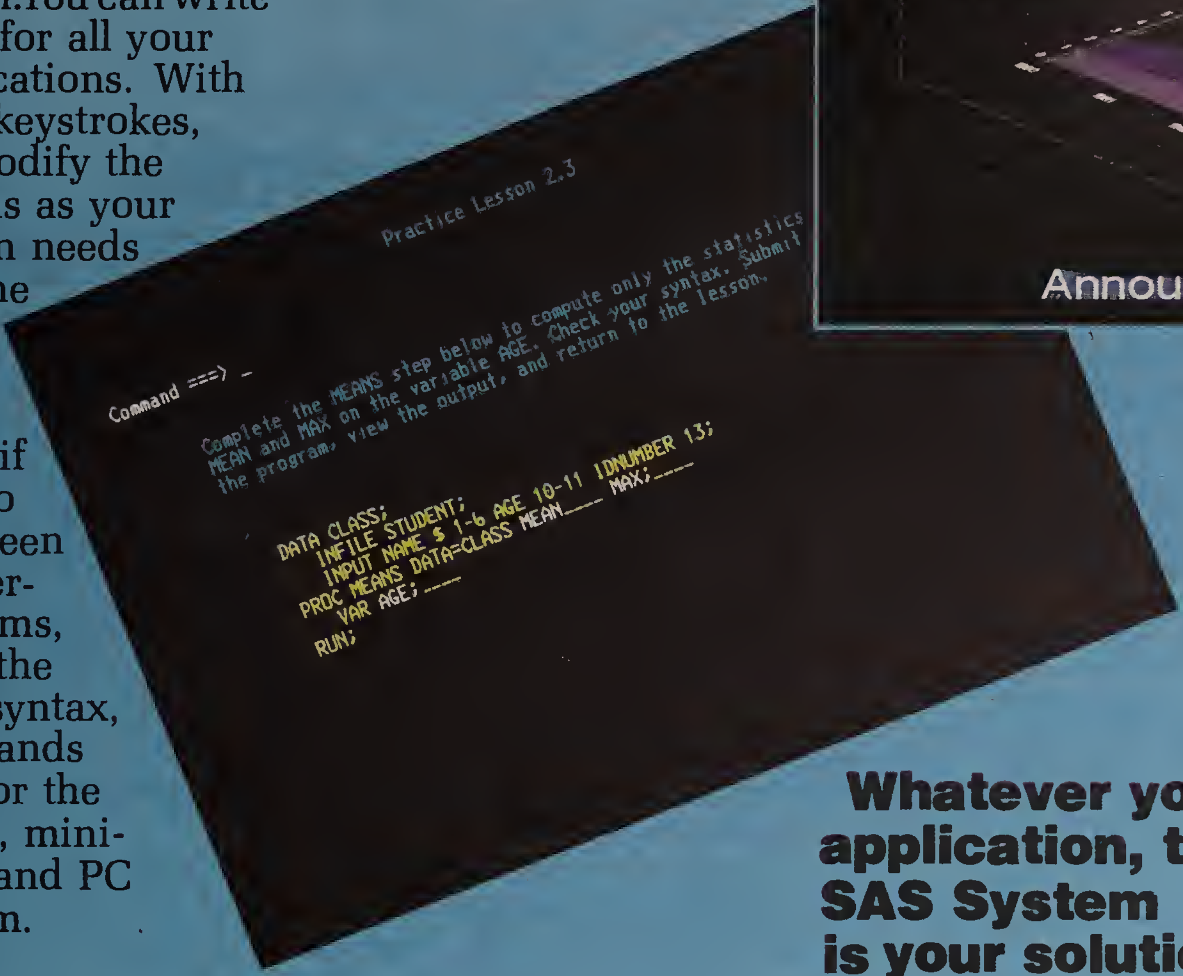


SYSTEM for Your Information Center.

ware resources or system usage, test data bases, and run production programs.

One Solution that's Friendly.

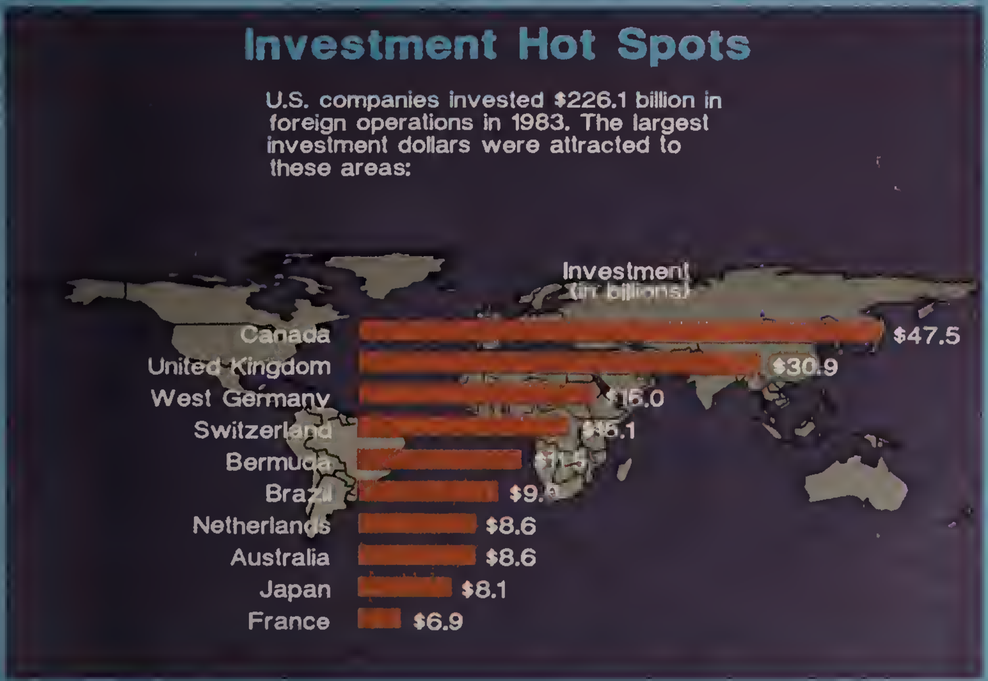
It's simple with the SAS System. You can write front-ends for all your SAS applications. With just a few keystrokes, you can modify the applications as your information needs change. One language handles all your tasks. And if you need to move between several operating systems, you'll find the language, syntax, and commands the same for the mainframe, minicomputer, and PC SAS System.



```
                              Practice Lesson 2.3

Command ===> _

    Complete the MEANS step below to compute only the statistics
    MEAN and MAX on the variable AGE. Check your syntax. Submit
    the program, view the output, and return to the lesson.


       DATA CLASS;
          INFILE STUDENT;
          INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
       PROC MEANS DATA=CLASS MEAN____ MAX;____
          VAR AGE;____
       RUN;
```

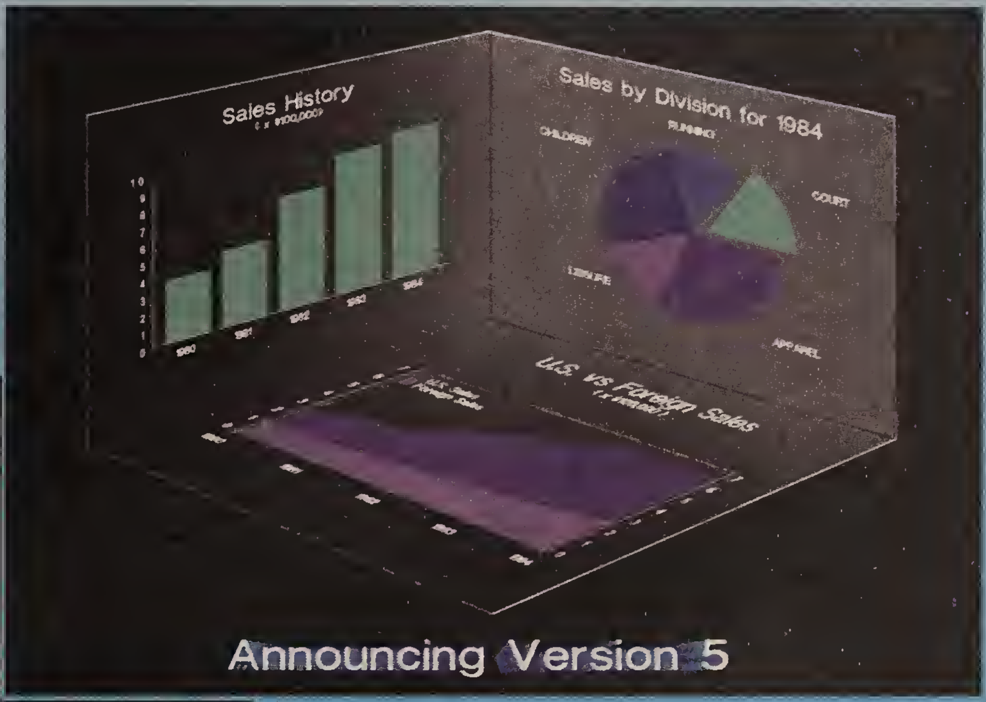
One Solution with Full Support.

Training is easy too. We offer instructor-based, video-based, and computer-based training. Technical support is provided for our mainframe, minicomputer, and microcomputer users, and documentation comes with your system.



Investment Hot Spots

U.S. companies invested $226.1 billion in foreign operations in 1983. The largest investment dollars were attracted to these areas:



Announcing Version 5

Call us today. International customers, call the International Marketing Department for information on your local distributor.

Whatever your application, the SAS System is your solution.

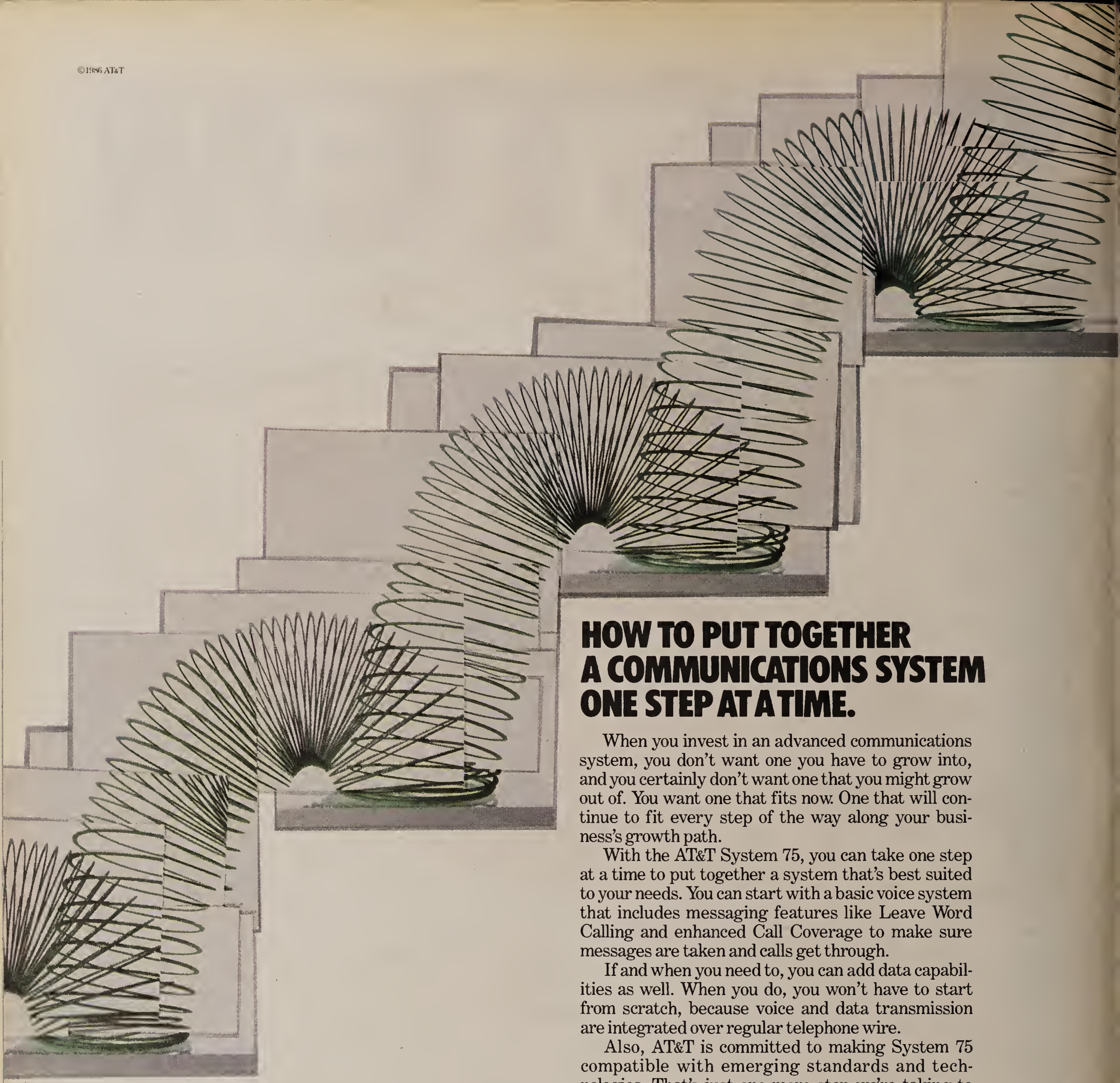
SAS Institute Inc.
SAS Circle, Box 8000
Cary, North Carolina
27511-8000, USA.

(919) 467-8000, x280
Telex 802505

The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, TSO, CMS, DOS/VSE, SSX, and ICCF; on Digital Equipment Corp. VAX™ 8600 and 11/7xx series under VMS™; on Prime Computer, Inc. Prime 50 series under PRIMOS®; on Data General Corp. ECLIPSE® MV series under AOS/VS; on IBM XT/370 and AT/370 under VM/PC; and on IBM PC XT and PC AT under PC DOS. Not all products are available on all operating systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. VAX and VMS are trademarks of Digital Equipment Corp., Maynard, MA. PRIMOS is the registered trademark of Prime Computer, Inc., Natick, MA. ECLIPSE is the registered trademark of Data General Corp., Westboro, MA.
Copyright © 1985 by SAS Institute Inc. Printed in the USA.

©1986 AT&T



HOW TO PUT TOGETHER A COMMUNICATIONS SYSTEM ONE STEP AT A TIME.

When you invest in an advanced communications system, you don't want one you have to grow into, and you certainly don't want one that you might grow out of. You want one that fits now. One that will continue to fit every step of the way along your business's growth path.

With the AT&T System 75, you can take one step at a time to put together a system that's best suited to your needs. You can start with a basic voice system that includes messaging features like Leave Word Calling and enhanced Call Coverage to make sure messages are taken and calls get through.

If and when you need to, you can add data capabilities as well. When you do, you won't have to start from scratch, because voice and data transmission are integrated over regular telephone wire.

Also, AT&T is committed to making System 75 compatible with emerging standards and technologies. That's just one more step we're taking to ensure the investment you make today is protected tomorrow.

For a free brochure about how AT&T can help you put together the communications system that's right for you, call us at 1 800 247-1212, Ext. 499.

AT&T
The right choice.

COMMUNICATIONS

DATA STREAM
Elisabeth Horwitt

Protocols don't stand alone

Something unprecedented occurred at a recent press preview of AT&T's Network of the Future exhibit [CW, Oct. 6]. Dick Snowden, director of service concepts for the AT&T business marketing group, was discussing an intriguing research project in progress at Bell Laboratories — a packetizing technique enabling the same switching facilities to handle voice, data and image transmissions in the same high-speed, economical fashion.

Snowden said the technology "offers enough clear benefits" to become part of a commercial service eventually, but that AT&T will not begin the implementation process until it and the other major carriers have agreed on standard protocols for key functions like error correction. "We can't develop those protocols independently," Snowden said.

This remark shows how drastically the market has changed since predivestiture days, when Ma Bell set telecommunications standards and other carriers and equipment vendors had no choice but to follow. Now, AT&T is just one more vendor — albeit a formidable one — lobbying for industrywide adoption of the technologies and protocols it wants to use.

And sometimes AT&T has failed to win converts. For instance, the former Ma Bell has unsuccessfully tried to persuade its former progeny, the divested Bell operating companies, to introduce secondary channel support to their Dataphone Digital Services (DDS).

See **PROTOCOLS** page 29

Horwitt is Computerworld's *senior editor, communications.*

SNA to non-SNA link unveiled

IBM protocol converter is no longer necessary

By Elisabeth Horwitt

RALEIGH, N.C. — A gateway recently introduced by Netlink, Inc. provides access to IBM's Systems Network Architecture (SNA) for a group of non-SNA devices emulating a wide range of terminal protocols.

"SNA-Gate enables users to have a pure SNA network that includes non-SNA devices," Netlink Vice-President of Marketing David McCormick said. "Before, you needed a protocol conversion either in a box or in the front end. SNA-Gate takes the place of an IBM protocol converter."

Shared Medical Systems Corp., a Malvern, Pa., hospital information system service company, has been beta-testing SNA-Gate for over a year as a way to connect an extensive installation of Digital Equipment Corp. VAXs, Four-Phase Systems, Inc. computers and IBM Personal Computers into its IBM SNA VTAM network.

"We currently are a big Telecommunications Access Method (TCAM) shop and are using bisynchronous connections, but good old IBM has told us that they will pull the rug out from under TCAM within the next couple of years and that we have to convert entirely to SNA and VTAM," a company spokesman said. "We had already begun internally developing a bisync-to-SNA conversion product when we heard that Netlinks would soon be on the market." If the system continues to perform well, Shared Medical Systems will begin installing it soon, he added.

The service company had found no other satisfactory bisynchronous-to-SNA product on the market, the spokesman added. "It isn't an easy thing to do. The Netlink people have expertise in all the right places."

"All of the top people at Netlink have

See **SNA** page 29

Tool links PC LANs to minis

By Stanley Gibson

ROSWELL, Ga. — Claiming to offer the first connection between an IBM Personal Computer local-area network (LAN) and an IBM System/36 or 38 minicomputer, Asher Technologies, Inc. recently introduced the Asher Minilink Gateway.

"The Minilink Gateway will dramatically reduce the number of discrete PC-to-mini devices required, including our own Minilink product," Asher Technologies President Wil Riner said. "Clearly, there is still need for many single-user applications, but networking is fast becoming the norm, especially for companies with minicomputers."

The product consists of a plug-in card and software that converts a networked IBM PC, Personal Computer XT or PC AT into a gateway server that can handle up to seven sessions between an IBM depart-

See **TOOL** page 28

VMX 5000 voice messaging system makes its debut

By Eddy Goldberg

NEW YORK — Reduced pricing, increased storage, remote diagnostics and integration with IBM's and Digital Equipment Corp.'s electronic mail systems are among the features offered by a voice messaging system recently unveiled by VMX, Inc.

Announced at the Info '86 conference, the VMX 5000 series voice messaging system provides users with additional functionality in several areas, the company said.

The VMX-5000's Data Integration Module, set for release in the first quarter of 1987, allows the Voice Message Exchange system to integrate with computer-based electronic mail systems. Users of IBM's Professional Office System and DEC's All-

See **VOICE** page 28

NEW THIS WEEK

- LAN Systems, Inc. offers Release 3.0 of its LAN APX Core Executive multitasking software
- For more on this and other new products, see pp. 95-114.

INSTANT ANALYSIS

"We've had an interesting minuet [in the post-divestiture regulatory arena] where the Federal Communications Commission is disco dancing, Judge Greene is waltzing and both are trying not to step on each other's toes."

— Andrew Lipman, partner, Pepper, Hamilton & Scheetz, at the EIC/Intelligence Fourth Annual Telecommunications Forum.

SYSTEM 2000® DBMS for Only $12,000

All the Extras Without the Extra Costs

You don't have to spend a bundle to get a full-function data base management system. For a first-year fee of $12,000, SYSTEM 2000® DBMS gives you:

- an integrated data dictionary
- on-line query/update
- a report generator
- relational data base access
- programming language interfaces
- high-quality training and technical support.

Renewal rates are even lower. Plus, you can now link SYSTEM 2000 DBMS with the SAS® System of software to build data bases, store and retrieve data, merge and manipulate data, perform your analyses, and produce reports and presentation graphics. You can even give Information Center users access to your DBMS through easy-to-use SAS menus.

Before you invest a bundle, find out why SYSTEM 2000 DBMS is the most economical data base management system in the industry.

SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA.
Copyright © 1986 by SAS Institute Inc. Printed in the USA.

SAS Institute Inc.
Box 8000, SAS Circle
Cary, NC 27511-8000
(919) 467-8000 Telex 802505

Voice messaging system out

From page 27

In-1 office system can be notified at their terminals that voice messages are waiting. The Data Integration Module also allows users to send voice messages through their computer terminals via text-to-voice synthesis.

Turbo Voicenet, immediately available, uses voice compression to send messages across phone lines 30% faster than they are spoken, reducing phone bills by nearly a third.

The VMX Manager introduces three system management capabilities that can be accessed through personal computers.

The Advanced Analysis Module allows access to and manipulation of VMX system reports.

The Mailbox Update Module allows system operators to perform data base changes from several PCs and batch them for sending to the VMX system. And a Directory Module provides on-line alphabetical listing of all system users and their addresses.

Backup storage

A Redundant Voice Storage feature automatically provides up to 258 hours of backup storage for voice messages. The VMX manager and Redundant Voice Storage will be available in the first quarter of 1987.

The VMX 5000 is built for easy serviceability and maintenance, according to company President and Chief Executive Officer W. Dal Berry. Line cards display diagnostic information and can be fine-tuned without special tools, and a new operator panel allows early problem detection. All critical components are field upgradable. The system also offers remote diagnostics.

The VMX-5000 also offers greater performance at a reduced price, compared with its predecessor, the VMX-3. Voice message storage has been increased on a 64-port base system from 82 hours to 87 hours, while the price has been cut by 25% from $525,000 for the VMX-3 to $390,000 for the VMX 5000. A 64-port system with 258 hours of storage is available immediately for $499,960. A boost to 516 hours of storage is scheduled for 1987.

Reduced footprint

An Intelligent Port Controller can handle more than 3,000 calls per hour, the company said. The VMX 5000's footprint has been reduced to a width of 33 inches.

The VMX-5000 introduction positions the Dallas-based company for a turnaround, according to Donald H. Van Doren, president of Vanguard Telecommunications, Inc. in Morristown, N.J.

"It gives them a chance to offer the same price/performance as the other companies that came along later," Van Doren claimed. VMX lost approximately $3.5 million to $4 million in its fiscal year, which ended last June, he added.

Tool links PC LANs to minis

From page 27

mental processor and PCs on the LAN. The server can operate as a terminal or PC while performing gateway functions in background mode, according to Pete Wilcox, director of engineering at Asher Technologies. The product works with any LAN that runs the IBM PC Network software interface, Netbios.

"I haven't seen it from anybody else," said Bob Zumwalt, director of operations for Kuppenheimer Manufacturing Co. in Norcross, Ga. Zumwalt plans to install the product shortly to connect PC LANs to his company's IBM System/38.

"We have a lot of users that need to go both ways, to and from the System/38" Zumwalt said, adding that he plans to have about 100 users communicating with the System/38.

Word processing, E-mail

Through the gateway, networked PC users can run word processing and exchange electronic mail on the System/38, using IBM's Office/38 package. The alternative was to buy a lot of individual emulation cards, one for each PC, at between $600 and $900 each, Zumwalt explained.

The gateway also supports windowing and concurrent file transfer, allowing users to upload or download one file while working on another in a window. There is also a hot-key function that permits the user to use one key to toggle back and forth between emulation and stand-alone PC processing.

Asher's gateway offers "big cost savings to users by allowing them to more efficiently leverage existing hardware and human resources," said Merv Adrian, chairman of the micro-to-mainframe special interest group of the NYPC users group.

Upgrade planned

An upgrade that Asher plans to introduce in November will enable the gateway to support IBM's PC Support/36 and PC Support/38. These products allow PC users to create virtual floppy disks on a System/36 or 38 and to use a System/36 or 38 printer as a PC printer, according to the vendor.

Wilcox added, however, that the PC Support packages are "rather slow," and that users such as Kuppenheimer's Zumwalt will get faster performance and more sophisticated functions on the Office/38 package that is already supported by the gateway.

Emulation modes currently supported by Minilink Gateway include IBM 5251, 5291 and 5295-1 displays and IBM 5219, 5224, 5225 and 5256 printers.

The price of the Asher Minilink Gateway is $2,290 for both board and software. Users can upgrade from the single-user version to the Minilink Gateway for $1,295 with no loss on the $895 purchase price of the single-user version, according to Asher. The product is being shipped now.

PERFORMANCE RDBMS FOR VAX/VMS.

At Citibank, in New York, software and VAX* hardware were proposed for a relational database requirement.

Result? The benchmark test series concluded that:

..."there exists no database management system that matches the performance of the IDM with OMNIBASE." **(1)

The tests compared the Britton Lee Intelligent Database Machine against a relational database software system, running on a VAX-11/785 in a cluster configuration. "On the average, the specialized database machine consistently outperformed the software by a five to one ratio."(2)

For large DBMS applications of multi-gigabyte size, such as Citibank's, the Britton Lee IDM offers the best relational database system performance.

Britton Lee's specialized hardware and operating systems manage relational databases efficiently and cost effectively. Give us a toll-free call.

Britton Lee, Inc.
14600 Winchester Boulevard
Los Gatos, CA 95030
1-800-372-7111
1-800-624-6426 (Calif.)

High Performance Relational Database Systems

*VAX is a registered trademark of Digital Equipment Corp. **OMNIBASE, VAX/VMS is a Signal Technology, Inc. interface, (1)(2) Hardcopy, 8/'85, © Brian Edwards.

This is all your PC needs to communicate with your mainframe.

SyncLink® synchronous PC modems come complete with everything you need to communicate with your mainframe over ordinary phone lines—including MicroGate® 2780/3780, 3270, or user-programmable BSC emulation software. Just install the SyncLink modem in your IBM PC, PC-XT, PC-AT, or compatible; plug the cable into a telephone outlet; and communicate! Available in Bell-compatible 201C (2400 bps) and 208 A/B (4800 bps) versions. Both versions feature auto-dial, auto-answer capability and built-in diagnostics.

SyncLink 201C
ONLY
$995.00
Complete with software

Call or write for complete details.

gateway microsystems
incorporated
9501 CAPITAL OF TEXAS HIGHWAY NORTH, SUITE 105
AUSTIN, TEXAS 78759 (512) 345-7791

THE BUTLER DID IT.

If it seems like someone is always lifting the latest COMPUTERWORLD, it's time to subscribe.

COMPUTERWORLD: Start your own subscription, $38.95 gets you 51 weekly issues. Plus, get 10 bonus issues of COMPUTERWORLD FOCUS, each an in-depth analysis on a timely topic.

Best of all you'll get the news while it's still new. Even before the butler.

COMPUTERWORLD

Keeping Up With Today.
Anticipating Tomorrow.

Fill in the blanks and mail in the attached postage-paid envelope.

Please enter my subscription to COMPUTERWORLD at the low Special Introductory Rate of just $38.95 for 51 issues — a savings of $5 off the basic rate. Plus, I'll receive the COMPUTERWORLD FOCUS issues FREE with my subscription.

☐ Payment enclosed ☐ Bill me
☐ Charge my credit card ☐ AmEx ☐ VISA ☐ Mastercard

Signature ______________________ Card Expires ________

FIRST NAME M I LAST NAME
TITLE
COMPANY
ADDRESS
CITY STATE ZIP

Address shown: ☐ Home ☐ Office

☐ I'm already a subscriber, but I'd like to extend my subscription at this special low rate. (Attach mailing label.)

Canada, Central & South America $110/ Europe $165/ All other countries $245 (Airmail).
Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for the special introductory rate.

Basic Rate: $44

COMPUTERWORLD

Detach here, place in envelope, and seal securely

Please indicate your business, function, and computer involvement below.

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Public Utility/Communications Systems/Transportation
   - 70. Mining/Construction/Petroleum Refining/Agriculture
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer Service Bureau/ Software/Planning/Consulting
   - 90. Computer/Peripheral Dealer Distributor/Retailer
   - 75. User Other ____________
   - 95. Vendor Other ____________

2. OCCUPATION/FUNCTION (Circle one)
   - 11. President/Owner/Partner/General Manager
   - 12. VP/Assistant VP
   - 13. Treasurer/Controller/Financial Officer
   - 21. Director/Manager/Supervisor DP/MIS Services
   - 22. Director/Manager of Operations/ Planning/Admin Serv
   - 23. Systems Manager/Systems Analyst
   - 31. Manager/Supervisor Programming
   - 32. Programmer/Methods Analyst
   - 35. OA/WP Director/Manager/Supervisor
   - 38. Data Comm Network/Systems Mgmt
   - 41. Engineering/Scientific/ R&D/Technical Mgmt
   - 51. Manufacturing Sales Reps/Sales Marketing Mgmt
   - 60. Consulting Management
   - 70. Medical/Legal/Accounting/Mgmt
   - 80. Educator/Journalist/Librarian/Student
   - 90. Other ____________

3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems

3317-8642

SNA-non-SNA link unveiled

From page 27

between 10 and 12 years of SNA expertise with IBM," agreed Claire Fleig, director of systems research at Los Altos, Calif., consulting firm International Technology Group. "Jumping into the SNA market is not like jumping into the micro market," she added.

SNA-Gate is likely to appeal to Fortune 500 services companies, many of which want to link Digital Equipment Corp. and Wang Laboratories, Inc. office automation systems to their IBM hosts, and to research-oriented firms that want their VAXs and engineering workstations to share data with IBM hosts, according to Fleig.

SNA-Gate provides SNA conversion for between 60 and 80 terminal, personal computer, printer and minicomputer systems emulating various terminal protocols. Protocols supported include ASCII, bisynchronous 3780 and 3271.

Supports multiple protocols

In addition, the product supports 3275 protocols, which the Wang Office automation system uses to connect with an IBM host over a dial-up switched network, according to McCormick. "We also convert Burroughs Corp. Poll Select protocols to SNA," he added.

The gateway concentrates incoming user lines into a single trunk, saving companies on-line facilities, McCormick said. SNA-Gate reportedly supports either RS-232 connections for speeds of up to 19.2K bit/sec. or V.35 port connections for 56K bit/sec. transmission speeds. Devices can be attached in two ways; either directly or via leased or dial-up modem connections.

Each type of user session is mapped to an IBM logical unit by the device. The number of active ports supported concurrently varies with transmission speeds. For example, SNA-Gate can handle up to 16 terminals transmitting at 300 bit/sec. but only one minicomputer transmitting at 9.6K bit/sec., according to McCormick.

One gate per host

Each SNA-Gate feeds into one SNA host. Ports can be individually reconfigured by loading software from a central point: the host's VTAM application.

SNA-Gate Model 3703-1, which supports asynchronous and bisynchronous devices, is priced from $7,500 for 2 ports to $13,800 for 16 ports. Model 3703-1A, which supports only asynchronous devices, is priced from $4,500 for 10 ports to $7,200 for 16 ports. Both models are said to be available now.

"I expect to see Netlink filling other gaps in the SNA puzzle soon," Fleig said. "The SNA-Gate is a good beginning."

Netlink is "moving toward a product that will support LU6.2," McCormick said.

Protocols don't stand alone

From page 27

AT&T has been ready since before divestiture to provide this channel, which would enable DDS for the first time to carry diagnostic and other network management-related information. But the regional companies, freed by divestiture from AT&T's control, only recently began filing tariffs for secondary channel support on that last crucial link to customer premises [CW, October 6].

The telecommunications industry also failed to follow AT&T's lead in defining the D channel that supports signaling on the Integrated Services Digital Network (ISDN) basic interface.

Before the ISDN basic rate was finalized, AT&T went ahead and developed Digital Communications Protocol (DCP), a workstation-to-private branch exchange interface that AT&T called the forerunner to the ISDN basic rate.

AT&T 'gambled, lost'

Unfortunately for AT&T, it guessed wrong, allocated 8K bit/sec. bandwidth for out-of-band signaling on DCP and then found out that the ISDN basic rate allocates 16K bit/sec. bandwidth. "We gambled and lost on that one," an AT&T spokesman says ruefully.

If Snowden's comments are any indication, AT&T has learned something from the above debacles and is more willing to cooperate with other carriers and equipment vendors — even wait for them to catch up to its own technology level, when necessary — in order to facilitate the implementation of the industry standards that will ensure that its own services get delivered smoothly to the user.

"We've had 10 years to develop out-of-band signaling, which means we're well ahead of competitors in our ability to provide on-demand service applications," Snowden points out. "But we still have to wait for the evolution of ISDN primary rate signaling that will link our central offices to those of, say, Illinois Bell.

"Divesture has made interoperability a lot tougher, because we can't simply extend our out-of-band signaling to the divested Bell operating companies. And we don't want to implement the signaling channel on our own premises once now and then again when the standards are finalized," Snowden adds.

If only computer and local-area network vendors had adopted that bit of wisdom a few years ago. Imagine how much easier life would be if the International Standards Organization's Open Systems Interconnect standard had been developed in time to become an intrinsic part of Digital Equipment Corp.'s Decnet and All-In-1, IBM's Token-Ring, Wang Laboratories, Inc.'s Wang Office and all of those other systems that MIS and communications managers are now vainly trying to link together.

IRMA.™ KLONE.™ $595. FREE TRIAL.

100% IRMA COMPATIBLE. MADE IN USA.

KLONE is a low cost, generic replacement for Irma, the micro to mainframe link for IBM 3270 users. KLONE includes **all hardware and full emulation software.** Any and all programs that support Irma will support KLONE. Configured and programmed from floppy disk, KLONE allows enhancements and upgrades without changing ROMs or disassembling the PC. KLONE is manufactured and backed by Agile, a company with over 8 years experience in IBM product emulation.

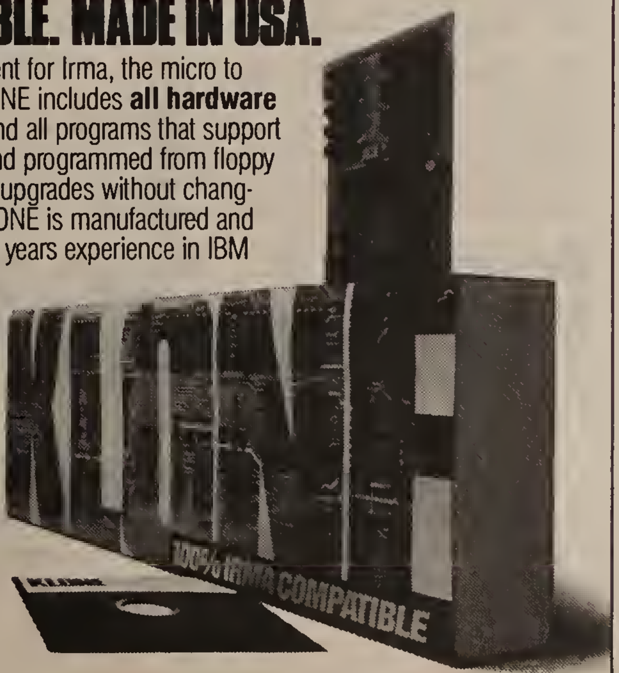
30 DAY FREE TRIAL.

KLONE is being offered to you at no risk. If after 30 days use you are not 100% satisfied with KLONE's performance, you may return it at no charge. Call now for info.

800-538-1634

(Inside CA, call collect
415-825-9220)

AGILE
4041 Pike Lane, Concord, CA 94520



Irma is a trademark of Digital Communications Associates, Inc.
KLONE is a trademark of AGILE

RDBMS: THE MEGABUCK STOPS HERE!

One of the largest U.S. financial corporations had a Relational Database Management System requirement.

Ingres software and VAX hardware were proposed. Cost? $99,000. for the Ingres . . . plus $933,000. for the VAX hardware to run it! More than a megabuck. The bottom line about software database systems:

VAX is the real cost of Ingres and Oracle!

The solution was a smaller VAX system teamed up with a Britton Lee relational database machine. This megabuck-stopping combination provided *three times the performance* and saved our client *$343,000.*, a cost reduction of one third!

Britton Lee's specialized hardware and operating systems manage relational databases efficiently and cost effectively. This is well known to companies using Britton Lee database systems. They were all interested in stopping the megabucks! Our database secrets are yours for the price of a toll-free call.

Britton Lee, Inc.
14600 Winchester Boulevard
Los Gatos, CA 95030
1-800-372-7111
1-800-624-6426 (Calif.)

High Performance
Relational Database Systems

INGRES WILL PAY YOU TO BENCHMARK SOMEBODY ELSE'S DISTRIBUTED RDBMS.

We've heard the rumors, too. There are other guys who are saying they have a distributed database system.

OK, let's find out how good it is, assuming it's really available.

Test INGRES and any other distributed database. If you don't agree that INGRES offers superior features, functionality and performance, we'll pay you for your time and trouble.*

We can't think of a better way for you to separate myth from reality.

Unlike "born again" distributed systems, INGRES was designed from the beginning to provide true distributed functionality.

Call or write for our booklet, The INGRES Challenge. We will outline the parameters of our benchmark challenge in greater detail.

*If you accept the terms and conditions of our benchmark challenge and are not satisfied that INGRES performs as promised, we'll pay you $500 for your time and trouble. For more information, call or write Relational Technology.

(800) 4-INGRES

From Canada (415) 748-3444

Relational Technology
1080 Marina Village Parkway, Alameda, CA 94501

© 1986 Relational Technology

SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

IBM makes it interesting

At least IBM piqued people's interest, even if the answers were lacking once the company caught that interest and people began to ask a few questions. The IBM 9370, introduced two weeks ago, fell short of some customer expectations, but it did prove that the customer and IBM are again thinking in terms of distributed and departmental processing.

On the positive side, IBM acknowledged that there is some truth to the claims of early personal computer advocates and minicomputer vendors. Those groups have said for years that distributed processing will bring the glass-room world of the mainframe to a crashing end.

The fact that IBM, which was so slow to get into the personal computer market that it now owns, is moving its 370 architecture into office environments — which does not translate to office automation — shows that the computer giant recognizes the need to move processing closer to the user, even if the multimillion dollar mainframe remains a key element in corporate computing.

In the 9370's case, the user is likely to be the same person who has been running or writing mainframe applications such as accounting or payroll packages on a controlled-environment mainframe. But now users can do that work with the processor a few feet from their desk. The 9370 does not shape up as a machine to plug in and forget about. Support for IBM's VM,

See **IBM** page 32

Connolly is Computerworld's *senior editor, systems & peripherals.*

DEC boosts superminis' memory, expandability

By Rosemary Hamilton

MAYNARD, Mass. — Digital Equipment Corp. increased the maximum main memory and peripheral support of its VAX 8200 and 8300 superminicomputers, which were introduced earlier this year.

The enhancements are being sold under new packaging for the systems, called Configuration 2. The new systems reportedly double the expansion capabilities of current 8200 and 8300 models while requiring only 30% more floor space.

Configuraton 2 systems will be be offered as prepackaged models or as components and can support up to 32M bytes of main memory, a 33% increase over the 24M- byte maximum main memory configuration that exists on current 8200s and 8300s, now referred to as Configuration 1 systems.

The systems have a 24-slot VAXBI bus backplane, compared with a 12-slot VAXBI backplane on Configuration 1 models. The new backplane can support the additional memory, up to 16 disk drives, four disk controllers, three tape drives, 48 asynchronous communications lines and six synchronous communications lines.

The systems also have an Ethernet networking interface. A Unibus adapter is available as an option. Users can also purchase the system on a component basis. An entry-level model costs $89,000.

The Configuration 2 8300 has a starting price of $119,000; a prepackaged version costs $169,000. The prepackaged 8300 comes with 12M bytes of main memory, a 456M-byte disk drive, a KDB50 disk controller, a TU81-plus tape drive, a DMB32 communications controller and licenses for the VMS operating system and Decnet networking software.

The packages are designed to complement the prior models, and they can be incorporated into a Vaxcluster system, the vendor said.

NCR offers latest 32-bit Tower

Provides 16-user support, greater processing power

By Eddy Goldberg

NEW YORK — NCR Corp. has introduced the Tower 32/400, a 32-bit supermicro based on a 16.7-MHz Motorola, Inc. 68020 CPU with support for up to 16 users. NCR also renamed the Tower 32, a 48-user 68020-based machine, the Tower 32/600.

The 32/400, introduced during the Info '86 show in New York, offers the processing power of a 68020 CPU to a smaller number of users than would justify the purchase of the larger 32/600, said John Gray, program manager for Unix systems at NCR.

As the latest addition to the Tower family, the 32/400 offers more than double the performance of the 16-bit, MC68010-based Tower XP and more than triple that of the Minitower, according to Larry Miller, director of product marketing at NCR. Programs for the XP, MiniTower, 32/400 and 32/600 are object code-compatible across the line, he said.

"There is definitely a need for this class of product," said Ralph Mahoney, 5000 series program director for Sperry Corp. in Blue Bell, Pa. Sperry is an OEM customer for Tower systems designed to its own specifications.

Mahoney said the 16-user system will fill a need in the departmental computing area, employed in smaller corporate or governmental departments and workgroups as part of a network. "It's the right level of price/performance for departments in major corporations," Mahoney added. He said that he sees a market in the small-business environment for accounting-type solutions as well as vertical mar-

See **NCR** page 33

INSIDE

McDonnell Douglas adds to its Pick-based line of small business systems/**32**

NEW THIS WEEK

- Calcomp adds five electrostatic plotting systems to its 5700 plotter series
- For more on this and other new products, see pp. 95-114.

INSTANT ANALYSIS

"The problem with announcing products with a long lead time is that people tend to wait for them."

— George C. McQuilken, Software Productivity Research, Inc. president, on the impact of a one-year lead time for IBM's 9370 system.

Texas firm halves mainframe data backup with tape cache

Expensive cartridge conversion delayed

By Donna Raimondi

THE WOODLANDS, Texas — An oil and land development firm faced with increasingly undesirable daily data backup times has opted to install a tape cache device to cut backup times for its mainframe operation. The cache device, which can compact data to less than half its original space on the tape, has delayed an expensive leap into tape cartridge technology.

"We were not going to convert to tape cartridges, we were going to add them to our existing tape facilities. And because we were out of computer room space, that meant adding a new $200,000 raised-floor room," explains B. G. Blackburn, director of computer production at Mitchell Energy and Development Corp., based in The Woodlands. By installing a Memorex Corp. 6522 tape cache device, Mitchell has put off having to bring in cartridges for about two years, Blackburn says.

Mitchell's IBM 3081 Model K mainframe, running under IBM's MVS/SP, takes care of the computing needs of the entire business, according to Blackburn. The company drills oil and gas wells. It also constructs and manages pipelines and develops residential real estate, like the 12-year-old city it occupies.

Because of the current depressed economic conditions of the oil and gas business, saving both time and money is very important to Mitchell. "A total conversion to tape cartridge technology is down the road," Blackburn says. "It's not a horrendous job, it's just something that — if you can defer that type of expenditure for a time — it helps out in the present economy."

A data base system that requires "quite a bit" of direct-access storage device (DASD) space, according to Blackburn, helped bring the problem to a head. "It was costing us more than three hours a day to back up the DASD. With the tape cache device, we now have runtimes of less than two hours daily," Blackburn adds.

Mitchell brought in a beta-test version of Memorex's one-channel 6250 in 1985 and then upgraded to the two-channel 6522 model in March 1986. The tape cache device receives data from the CPU prior to entering the tape controller. Based on job control language (JCL) instructions, it will either pass the data straight on to the tape or compact it and reduce the amount of storage space required on the tape.

"We do not compact the data for our operating system backup or the related libraries, or on any files that we might send out to banks or other companies that we might send data to," Blackburn explains. That is because compacted data must be uncompacted using the same type of cache device. "We compact it for our daily and weekly backups and our own production files."

Prior to bringing in the device, backup required 126 tapes each night. With the compaction, Mitchell has brought that down to 66 vol-

See **FIRM** page 33

IBM makes it interesting

From page 31

VSE and MVS/SP seems to mean that an operator, systems programmer or other technical type should be close by. However, the system is a step in the right direction.

The questions that IBM leaves unanswered include some basic customer inquiries about what they will pay for a specific system with a specific performance level. Customers wonder why they have to wait a year before they see 9370s available in volume.

Another question deals with the impact the 9370 will have on the System/36 minicomputer that IBM has pushed on customers as an office automation and entry-level DP system.

OA capability limited

IBM customers who expected the 9370 to address their office automation woes were probably disappointed with what they saw. The apparent need for a trained attendant and the lack of direct personal computer connections under anything except Unix may limit the current 9370's office automation capability.

But even in terms of office automation, the 9370 seems to have potential. Analyst Bob Djurdjevic, president of Annex Research, Inc., maintains that the 9370s can be potent competitors for Digital Equipment Corp.'s VAX family in terms of compatibility and that the machines can kill the System/36 in terms of raw power.

Meanwhile, users of earlier IBM distributed processing systems may be looking favorably on the 9370. DPX, U.S.A., a research and consulting firm, last week said that the 9370, which some observers viewed as a replacement for the IBM 4361, is also the apparent successor to the 8100 family. The consulting firm speculated that IBM will follow one of two courses.

One would be to use a DPPX/370 solution to sell 9370s to 8100 users, while the other would be to promote DPPX/370 as a global distributed data processing solution.

MANAGEMENT
REPORTING/RETRIEVAL
CAPABILITY
for THE IBM S/38
For more information
Contact Charles White at:
michaels, ross & cole, ltd.
800 West Roosevelt Road
Building E, Suite 304
Glen Ellyn, IL 60137
(312) 790-5040

McDonnell Douglas augments Pick-based line

By James Connolly

IRVINE, Calif. — Adding a peripheral controller that increases the number of users supported, McDonnell Douglas Computer Systems Co. has introduced two high-end models in its M6000 line of small business systems.

The M6640 and M6650 reportedly support from 16 to 64 users, rather than the earlier maximum of 48 users supported by the M6527, because of the addition of the company's Peripheral LAN Controller.

"This new controller provides a more intelligent and higher performance level of terminal port control. With only a single board required for all 64 ports, the number of available ports is increased while significantly reducing the cost per port," said John Howarth, vice-president of marketing for McDonnell Douglas.

The systems bring to five the number of models in the M6000 family, which supports McDonnell Douglas's Reality version of Pick Systems, Inc.'s Pick operating system.

The key difference between the M6640 and the M6650, both of which offer from 1M to 2M bytes of memory, is that the M6650 can support a higher disk capacity. The 6640, which can be upgraded to the 6650, is available with 75M bytes of disk storage. The 6650 is available with up to 485M bytes of disk storage.

The printers of Texas
The printers you need when

Model 810: The 810 easily handles nine-part forms in high-duty-cycle applications, where its proven reliability and long life have helped make it the market leader in forms printers.

Model 855: The 855 is the perfect printer for LQ word processing. Its removable font modules are available in over 30 type styles and special character sets.

OmniLaser: Available in three models, the 2015 and 2115 for shared-resource applications and the 2108 for workstations. The OmniLaser is designed to print more, print longer, and for less.

Model 860: The Model 860XL offers draft and correspondence printing and is ideal for spreadsheets and forms up to 16 inches wide.

NCR offers 32-bit Tower

From page 31

ket applications.

Disk and tape I/O performance on the 32/400 has been improved through the use of a 16-bit Intel Corp. Multibus. Faster I/O between the CPU and memory has been achieved through a 32-bit proprietary bus.

The 32/400, priced from $14,995 to $54,810 depending on configuration, will begin shipping in quantity in November. Sales will be primarily to OEMs and value-added resellers.

The $14,995 base configuration includes 1M byte of main memory, 46M bytes of internal storage, a 48M-byte tape cartridge backup and NCR's Unix System V.2 business module operating system, which incorporates record and file locking.

Firm halves data backup

From page 31

umes. Each tape costs about $15. "That is more than just a little bonus," Blackburn says.

"We bought ourselves an hour and a half of computer time each day without making a large capital expenditure," Blackburn adds. "We added a dozen data volumes in the last year and still came out ahead in the backup game."

According to Blackburn, channel speed has effectively been increased from 1.5M to 3M byte/sec. "The channel speed itself actually remains the same. But once we achieved a certain level of compaction, then the effective throughput from the CPU to the tape becomes 3M byte/sec. or reaches close to that level," he says.

Bell Labs nets Darpa contract

By James Connolly

WHIPPANY, N.J. — AT&T Bell Laboratories plans to launch a parallel processing venture with the awarding of a contract from the Defense Advanced Research Projects Agency (Darpa).

AT&T officials said the $7.7 million, three-year contract calls for AT&T and subcontractor Fifth Generation Computer Corp. to develop prototypes of a computer that can recognize speech and images and do other complex pattern-matching tasks.

Robert Lewine, head of the Bell Laboratories Special Systems Design Department, said the goal of the project is to recognize large-vocabulary human speech as fast as it is spoken.

Fifth Generation Computer chief scientist Salvatore Stolfo said AT&T will extend his company's Dado binary tree parallel processing architecture to speech and image recognition.

AT&T representatives reported that the company expects to have the first prototype ready by next spring.

The Darpa contract was awarded under the Pentagon's Strategic Computing Initiative.

Instruments.
your needs are demanding.

Model 880: The 880 is the ideal choice for high-speed, high-duty-cycle data processing report applications that require unattended printing along with correspondence output.

Premium performance and industrial quality. That's what TI printers are known for. Their reliability has always been standard-setting. Their throughput, consistently high. And their quality surpasses the needs of their applications. Which means few, if any, failures and a minimum of downtime. In fact, about all the service a TI printer needs is a paper or ribbon change.

The reason is simple — every TI printer is made to do its job very well, for a very long time.

The Model 810. The workhorse.

For almost a decade, the Model 810 heavy-duty 150 cps system printer has been printing forms and data reports in virtually unattended operation. Its performance has been so reliable that it's the choice of most of the world's major airlines for ticket counter service for one reason. If they aren't printing tickets, they aren't making money. We even took the 810's field-proven architecture and put it to work in our Model 880 system printers. You can't argue with success.

The Model 880 Series. The 300 cps heavy-duty system printers.

Our 880s are the perfect upward migration and high-speed complement to the Model 810. They're twice as fast, fully compatible with the 810, offer correspondence-quality printing, raster graphics, and come in three models — the standard 880, the 880DP and the 880AT. The DP model offers the higher throughput necessary for high-speed data processing forms and report printing applications. And the AT model is ideal for multi-user environments because it is both hardware- and software-compatible with AT- and XT-class personal computers.

TI's micro-printers. They make more out of any PC.

Dual-mode, letter-quality, color printing and graphics, too. However you use your PC, there's a TI micro-printer to match. Our micro-printers feature front plug-in fonts, easy-to-use control panels and a long service life. They're also compatible with virtually all PC hardware and third-party software. Available in both 80- and 132-column carriage models.

Now, our OmniLaser™ Printers. TI's answer to the shared-resource laser environment.

The TI OmniLaser family of printers is the very first of the second generation of laser printers. Why did we wait? Laser printers of the first generation couldn't live up to our standards for function, quality and reliability. In fact, our OmniLaser printers are documented to last up to 15 times as long as their first-generation counterparts, with the lowest cost per page in the industry.*

To be TI printers, the OmniLaser had to print unerringly at incredible speed with unrivaled quality. And they had to be simple to use. The OmniLaser Model 2015 will last in shared-resource work environments where lesser printers fail. They had to be the "810" of laser printers.

So if you're equipping a computer system with printers, or replacing those you already have, demand the printers that fit your demanding needs. **Call 1-800-527-3500.** For the printers of Texas Instruments.

TEXAS INSTRUMENTS

31594
©1986 TI
OmniLaser is a trademark of Texas Instruments Incorporated.
*As reported in the March 1986 edition of *DataQuest*.

CHRIS GANE'S NEW BOOK

Developing Business Systems in SQL

using ORACLE on the IBM-PC

Just how flexible and powerful *is* this "language of the future"? Over 300 down-to-earth pages: full annotated code listings for sales/invent'ry/purchasing system using integrated relational database.

Send check for $45 per copy (plus $2 shipping in US, $4 non-US) or call 212/245-8870 at any time to order with your credit card, or for brochure.

Rapid System Developmnt.
211 W. 56th Street, #36H3
New York NY 10019-4323

Retire Your PC Coax Connection

The PC-to-host coax connection. She was a good piece of equipment working with coax cable and cluster controllers, but time just passed her by. End users started needing more than simple host access. They also needed their PCs to share resources around the office. That's when local area networks came along to fill the need.

LANs are dramatically increasing office productivity through efficient information management. And Gateways are exploiting LAN versatility by providing cost-effective host communication for PCs and other network devices. Now for thousands of dollars less, LANs and Gateways provide PC-to-PC and PC-to-host communications all without a cluster controller.

INS Gateway PC Adapters are engineered around proven INS SNA 3274 cluster controller emulation. A single INS Gateway PC Adapter in an IBM NETBIOS compatible LAN, including Token Ring, will support up to 32 logical unit sessions. The LAN allows each PC on the network to share disks, printers and other resources while the Gateway allows performance of any host-supported function and maintains host access.

INS planned on PCs becoming a major component in the development of information systems. We designed our Gateways to be the logical choice in providing the vital link between LANs and mainframes. We also planned on much more—flexibility, simplicity and reliability. We provide free, responsive user assistance and guarantee every INS Gateway PC Adapter (hardware and software) for five years.

Now the vast resources of mainframes and local area networks are available at your fingertips with INS Gateway PC Adapters.

Call now for more information about putting new life in your MIS/DP efforts with INS Gateway PC Adapters. Our toll free number is **(800) SNA-3270,** in Alabama (205) 633-3270. Or write Integrated Network Systems, P.O. Box 91395, Mobile, AL 36691. Telex: 701238.

See us at
COMDEX/Fall '86
November 10-14, 1986
Las Vegas Hilton Hotel
Las Vegas, Nevada
Booth H7432

INS

"THE NETWORK PEOPLE"
An ICOT Company

MICROCOMPUTERS

MICRO BITS
William F. Zachmann

Don't be left in the DOS dust

A recent conversation I had with the president of a medium-size company reminded me we may take for granted that others know what we already know. A strictly nontechnical person I know had been using an IBM Personal Computer for several years and was having trouble getting some new software started. He thought the disk he'd been given might be defective.

Putting the disk into the floppy disk drive, I found that it was in perfectly good order. The first-level directory contained COMMAND:COM and two subdirectory entries, one of which contained the software my friend wanted to use.

In explaining things to my friend, I discovered, to my surprise, that nearly everything I was saying was completely unfamiliar to him. He had, for the past two years, been loading Lotus Development Corp. 1-2-3 by putting the system disk in the A drive and turning the power on.

Beyond knowing that CTRL-ALT-DEL has the same effect, even the most elementary aspects of the Microsoft Corp. MS-DOS operating system were unknown to him.

He had been trying to load his software by putting the disk in the A drive and turning the power on, as he did with 1-2-3.

Mind you, I am talking about an intelligent, successful individual who has over two years' experience using personal computers. It's just that

See **DON'T** page 36

Zachmann is vice-president of research at International Data Corp.

Borland Prolog upgrade out

Provides more efficient, faster data management

By Peggy Watt

SCOTTS VALLEY, Calif. — Borland International, Inc. has released a new version of Turbo Prolog, its foray into artificial intelligence development tools, which includes faster compilation time and file-customization features.

The new release, Version 1.1, also includes instructions for modifying and linking Assembler and C programs with Prolog, according to Borland. An on-disk tutorial was expanded to include more than 100 examples of Prolog development, including an expert system, natural language interface and differential equations.

"The samples are where we can really show and tell what Prolog can do," said Mike Floyd, Prolog technical support representative. Programmers can go through the code to reconstruct the samples or modify them, "or if you're not a programmer, a lot of the sample programs can be used as is."

Also new is a generic pop-up menu program, which programmers can include in their source code for applications rather than writing their own pop-up menus, Floyd said.

The new version was designed to be faster and more efficient, according to Borland. It has an internal linker for single-step compiling, requires less memory space and has more efficient management of random-access memory-based data, Floyd noted. He said the new Borland Linker, with the help of the expanded compiler menu, will compile an executable file up to three times faster than the original version.

Many of the changes are answers to early users' comments, Floyd added. "We've been taking feedback and wanted to be responsive, especially with an early release like that," he claimed.

Upgrades to Turbo Prolog Version 1.1, available only for the IBM PC and compatible systems, will be provided free to all users who bought the original $99.95 release since its introduction in March.

Polytron's software acceleration tool debuts for IBM PCs

By David Bright

BEAVERTON, Ore. — Polytron Corp. early this month introduced a software acceleration program said to at least double the speed of IBM Personal Computer software.

Positioned as an alternative or complement to accelerator cards, the $79.95 package requires no software modification or extra hardware, according to marketing director Doug Root.

Users considering accelerator cards should try Polyboost-The Software Accelerator first, Root said, because it can increase a program's speed by two to 10 times.

See **ACCELERATION** page 37

Microsoft plans language links

By Peggy Watt

REDMOND, Wash. — Better connectivity among programming languages, some of it through a graphical interface such as Microsoft Windows, and new tools to take advantage of up-and-coming high-speed processors and serve a growing DP market are in the offing from Microsoft Corp.'s languages group.

Microsoft spokesmen related plans for language extensions to share calling procedures and be more portable among each other and among vendors at a recent daylong languages seminar for the press.

While systems and languages now produce 50% of Microsoft's revenue, demand for applications generators is expected to spurt, said Rob Dickerson, product

See **MICROSOFT** page 37

NEW THIS WEEK

- NEC introduces the PC-8500 portable
- For more on this and other new products, see pp. 95-114.

INSTANT ANALYSIS

"It looks like we're headed for a shakeout, and the industry's just starting. We may have some drop out without even shipping."

— Paul Grayson, chairman and CEO of Micrografx, Inc., on desktop publishing.

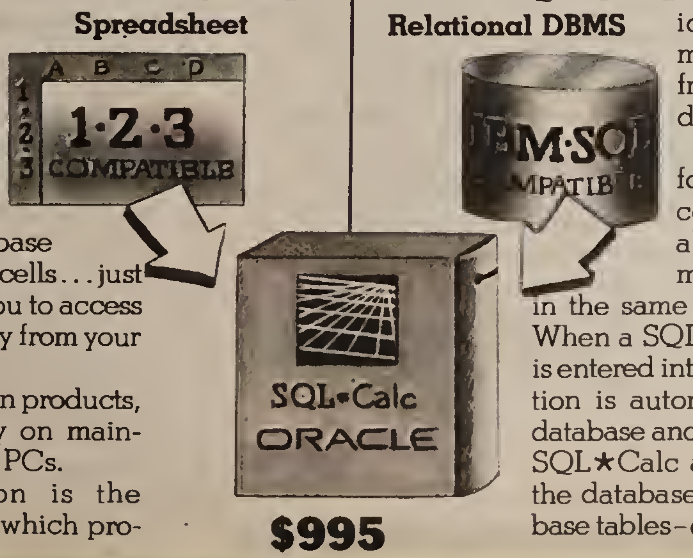
Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc,® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells . . . just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.



Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database–and even create new database tables–directly from the spreadsheet.

SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

ORACLE®

Compatibility • Portability • Connectability

* Please inquire about our "Corporate 50" program for quantity licensing.
Copyright © 1986 by Oracle Corporation. ORACLE,® SQL★Calc® Oracle. IBM, AT&T, Lotus and Ashton-Tate own numerous reg. trademarks. TRBA

HARDWARE MAINTENANCE
- Specializing in ATM's & on-line teller equipment, 3270X & PC'S

INSTALLATION SERVICES
- Cable networks
- Deinstall & warehouse data processing equipment

EQUIPMENT SALES & LEASING
- Buy, sell, reconfigure & refurbish computer hardware

tellerline™ PRODUCTS
- Designed & manufactured to enhance 4700 equipment

TSSI

A • Upper Marlboro, MD • Middletown, CT • Cranston, RI • Tampa, FL • Ft. Lauderdale,
Voburn, MA • Orlando, FL • Tallahassee, FL • Long Beach, CA • Denver, CO • Fresno, C
ardena, CA • Sacramento, CA • San Diego, CA • Burlingame, CA • Atlanta, GA • Baltimo
ID • Chicago, IL • Edison, NJ • Lancaster, PA • Mount Vernon, NY • Philadelphia, PA • Up
Marlboro, MD • Middletown, CT • Cranston, RI • Tampa, FL • Ft. Lauderdale, FL • Woburn, M
Orlando, FL • Tallahassee, FL • Long Beach, CA • Denver, CO • Fresno, CA • Gardena,
Sacramento, CA • San Diego, CA • Burlingame, CA • Atlanta, GA • Baltimore, MD • Chica
L • Edison, NJ • Lancaster, PA • Mount Vernon, NY • Philadelphia, PA • Upper Marlboro, M
Middletown, CT • Cranston, RI • Tampa, FL • Ft. Lauderdale, FL • Woburn, MA • Orlando, F
allahassee, FL • Long Beach, CA • Denver, CO • Fresno, CA • Gardena, CA • Sacramen
A • San Diego, CA • Burlingame, CA • Atlanta, GA • Baltimore, MD • Chicago, IL • Edison, N
ancaster, PA • Mount Vernon, NY • Philadelphia, PA • Upper Marlboro, MD • Middletown, C

81 Croton Avenue • Ossining, New York 10562 • In N.Y. State (914) 762-5910 • Toll Free 1-800-431-8500

MICROCOMPUTERS

Don't be left in the DOS dust

From page 35

all of that has been within a single automatically loaded program. This incident drove home the point that there are an awful lot of people who still have a lot to learn about using personal computers.

Coincidentally, it was the evening after this episode that I first broke the shrink wrap on Microsoft's Learning DOS. This package, which costs $29.95, is precisely what is needed to make things easier for people who could benefit greatly from learning about MS-DOS but are not quite sure how to go about it.

Learning DOS comes with a slim, useful manual and four floppy disks, one of which is actually advertising. The disks are titled "Lessons for Systems with a Hard Disk," "Lessons for Systems without a Hard Disk," and "DOS Quick Reference." The first two are on-line tutorials; you use one or the other, depending on whether the system you will normally use has a hard disk.

Using a very attractive menu interface, the "Lessons" disk provides an extremely useful and well-designed introductory course in using MS-DOS. Followed through from start to finish Learning DOS will give anyone a full understanding of and proficiency in the use of MS-DOS.

Starting with the most basic considerations, with well-conceived and well-executed explanations, Learning DOS goes on to cover files and directories using applications, backup and hardware setup commands, including AUTOEXEC.BAT and CONFIG.SYS files. Even a user more or less familiar with DOS is likely to learn something useful with the tutorial.

The whole thing is designed so that the beginner can start at the beginning and work right through. More experienced users are encouraged to work through selected lessons identified as covering "core concepts and skills." And hotshots are invited to try the summary "Practicing What You've Learned" self test. "This will give you," as the documentation puts it, "a good idea of what you still need to learn." It does.

The lessons are well organized. Each normally includes one or more practice sessions that put the material learned to use, thus reinforcing learning. Lessons can be skipped if desired, however, by simply pressing ALT and the space bar.

The menu structure lets you go where you like in the tutorial. In addition, in a clever and innovative way, pressing the CTRL key calls up a menu bar across the bottom of the screen. This indicates letter keys that may be pressed while still holding down the CRTL key. These are used to go back a screen, get a hint while practicing, go to the index, go to the menu, skip the practice, quit the course, skip to the lesson summary or skip to the troubleshooting session.

The manual, in addition to explaining how to use the program, contains a useful section titled "DOS Tips: Advanced Features" covering more advanced topics like filters, pipes and redirection, as well as amplifying a number of other topics more briefly treated in the tutorial.

Best of all, however, is the "DOS Quick Reference" facility that comes on the fourth diskette. In fact, this is an enormously useful Help command that provides an on-line MS-DOS Help facility. This is not merely a handy reference for beginners but a useful tool for experienced users. If you can never remember all the parameters of infrequently used commands like MODE and PROMPT, you are likely to be as appreciative of the Help facility as I am.

Learning DOS is an excellent program that will be especially attractive to information center personnel pressed with the need to train and support end users. It is certainly going to save me a lot of time that might otherwise have been spent explaining DOS to colleagues and friends.

Gene Amdahl describes new enhancements
to ELXSI's System 6400 parallel multiprocessing computer.

"...our new M6420 processor and 768 Mbyte memory give you a more powerful tool. Our new VMS compatibility makes the tool even more widely applicable."

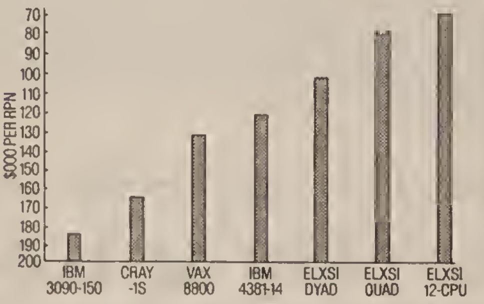
"Although the ELXSI™ System 6400™ has already filled the gap between supermini and supercomputer very well, we recently saw a chance to make important product enhancements.

New, extended performance CPU

"The most significant introduction is our M6420 Extended Performance CPU. Benchmarks show performance improvements of up to 200 percent over our existing M6410 processor, which boosts the high-end performance of the System 6400 to well over 100 Whetstone MIPs.

"With its plug-in parallel processing capability, this gives the System 6400 a price/performance advantage over almost any equivalent system, from VAX and IBM models (see bar-chart) up to and including the Cray 1-S supercomputer.

"Because of the System 6400's architecture, this new processor won't obsolete any of our existing M6410 CPUs—they'll work side by side in the same system, with no modification necessary.



Price/Performance of systems from Cray, DEC and IBM, compared with a dual-M6420 ELXSI Dyad, a four-M6420 ELXSI Quad and a fully configured 12-M6420 ELXSI system. Bars represent published system prices divided by a Relative Performance Number (RPN). This number is based on relative performance data reported in ComputerWorld Roundup, plus ELXSI benchmark test results.

Internal memory boosted up to 768 Megabytes

"New memory arrays provide up to 768 Mbytes of internal memory, using 256 Kbyte RAM chips. That's the largest main memory available today in anything short of a supercomputer!

"What's more, we are now testing one-Megabit RAMs, and in early 1987 we'll offer arrays with up to two Gigabytes of system memory, which can be installed into existing System 6400s immediately. No reworking necessary.

"Up to now, users with memory-dependent applications, such as IC design or circuit simulation, could only work with a portion of their

Gene M. Amdahl Ph.D.—Chairman and CEO of Trilogy, the parent corporation of ELXSI—is renowned for his contributions to large scale computing. Dr. Amdahl started his career with 13 years at IBM, where he developed the first compatible mainframe line, the System/360. He founded Amdahl Corp. in 1970, and Trilogy Systems, Inc. in 1980. In 1985, after evaluating the system architecture of several parallel processing companies, Dr. Amdahl selected ELXSI as a merger partner after concluding that the company had the most advanced and expandable computer in the industry. Shortly after, ELXSI merged with Trilogy Ltd. and became a wholly owned Trilogy subsidiary.

models in main memory at one time. Now they can load entire 15 or 20 Mbyte models, and larger. They can work with the whole thing in real time, eliminating complicated overlays or program segmentation schemes.

"This capability alone can speed up processing time on a par with a faster CPU. In fact, large memories allowed one ELXSI user to bring a new product to market three months ahead of schedule.

New compatibility with DEC systems

"ELXSI has an ongoing commitment to compatibility with DEC™ VMS™ environments. Our new EMS™ Environment software will give VAX™ users a simple migration to a powerful parallel multiprocessor, our System 6400, which will handle all their applications in conjunction with their existing VAX equipment.

"This EMS software emulates a VAX computer more closely than any other computer available today. It allows VAX users, with no additional training, to perform almost any job on an ELXSI system which can complement and extend the capabilities of the largest VAX with 24 times more memory and more than six times the processing power...and provide parallel processing as well.

"The new products include ECL,™ which emulates the DCL™ Digital Command Language Interpreter; ERT,™ which emulates the VMS System Services and Run-Time Library routines; and an EDT-compatible Editor.

"By the first quarter of 1987, ELXSI will support CommUnity,™ a DECnet™ Phase IV End Node emulation, enabling our 6400s to communicate with VAXs running DECnet Phase III and later versions."

ELXSI makes large-scale computing practical

ELXSI introduced the first commercial parallel processing computer in 1983, and today has major installations around the world.

System 6400 computers serve hundreds of users at a time, performing a wide variety of sophisticated technical and scientific applications in aerospace, electronics and government labs, and in large UNIX operating system environments.

Ask for product and application information on ELXSI's powerful System 6400 family. From ELXSI, 2334 Lundy Place, San Jose, CA 95131. Phone (408) 942-0900.

ELXSI, System 6400, EMBOS, EMS, ECL and ERT are trademarks of ELXSI.

DEC, VAX, VMS, DCL and DECnet are trademarks of Digital Equipment Corp.

UNIX is a trademark of AT&T.

Cray is a trademark of Cray Research Inc.

CommUnity is a trademark of Technology Concepts, Inc.

ELXSI

ELXSI is a wholly owned subsidiary of Trilogy.

Microsoft plans language links

From page 35

marketing manager of Microsoft's languages group.

"We believe Excel won on the Macintosh because it was programmable and Jazz was not," Dickerson said of the competing integrated business packages from Microsoft and Lotus Development Corp. "Very few of our applications are not programmable at some level."

But new development tools are in increasing demand and on the horizon, according to Microsoft.

"DP departments are becoming the most significant users. With the 80286 systems' debut and promises of the 386, the PC is become a viable machine for prototyping for a mainframe," Dickerson noted. Increased DP control with the appearance of networks also promises "more microcomputer programming than ever before," Dickerson said.

High-performance needs

Some needs of those high-performance microprocessors are being explored with Windows, Microsoft's graphic operating environment, said Paul Davis, senior engineer and member of the Windows' marketing team. Some variable memory allocation capabilities are in Windows, he said. With the C language, for example, a Windows programmer can break memory into small chunks for different programming or application tasks.

The memory management challenge of the advanced 80286 and 80386 micros will require segmenting and some shared files, said Greg Whitten, Microsoft language development director.

Microsoft also tries to extend 80286 capabilities to the next chip generation, he said. "We've turned the 286 linker into a 286/386 linker," he said.

'Acts like a fast 8088'

"The 286 real time mode acts like a fast 8088, with 16 segments," Whitten continued. "To write to both, you must write to the subsets of 8088 and 80286 instructions and also to a segmented programming model." By writing a program to address smaller chunks of memory, it will still run in 8088/8086-based systems, but take advantage of advanced chips' capabilities when available.

Future releases of languages will also share characteristics, according to Microsoft. "The code generator in C will be used in the next Fortran," Whitten claimed. "We try to synchronize the language releases."

A Windows Basic is coming, however, along with "some tools that will make it easier to write to Windows in Pascal and Fortran," Dickerson said. Xenix tools show up faster, such as the 80386 Xenix tool kit recently announced at the unveiling of Compaq Computer Corp's 80386-based system. However, an MS-DOS built to take advantage of 80386 capabilities will not be on the shelves soon.

"When we get to Protect mode, I think we'll have some very nice language tools to use to develop some very impressive applications," Whitten said. "We're waiting for a target environment based on DOS."

Acceleration tool debuts

From page 35

The package is a set of three memory-resident programs — disk access, screen display and keyboard input — that speed up three input/output functions on the IBM PC, Personal Computer XT and AT. Because the disk access portion offers the most significant performance boost of the three functions, Polyboost will greatly speed disk-intensive applications, particularly data base management systems, Root declared.

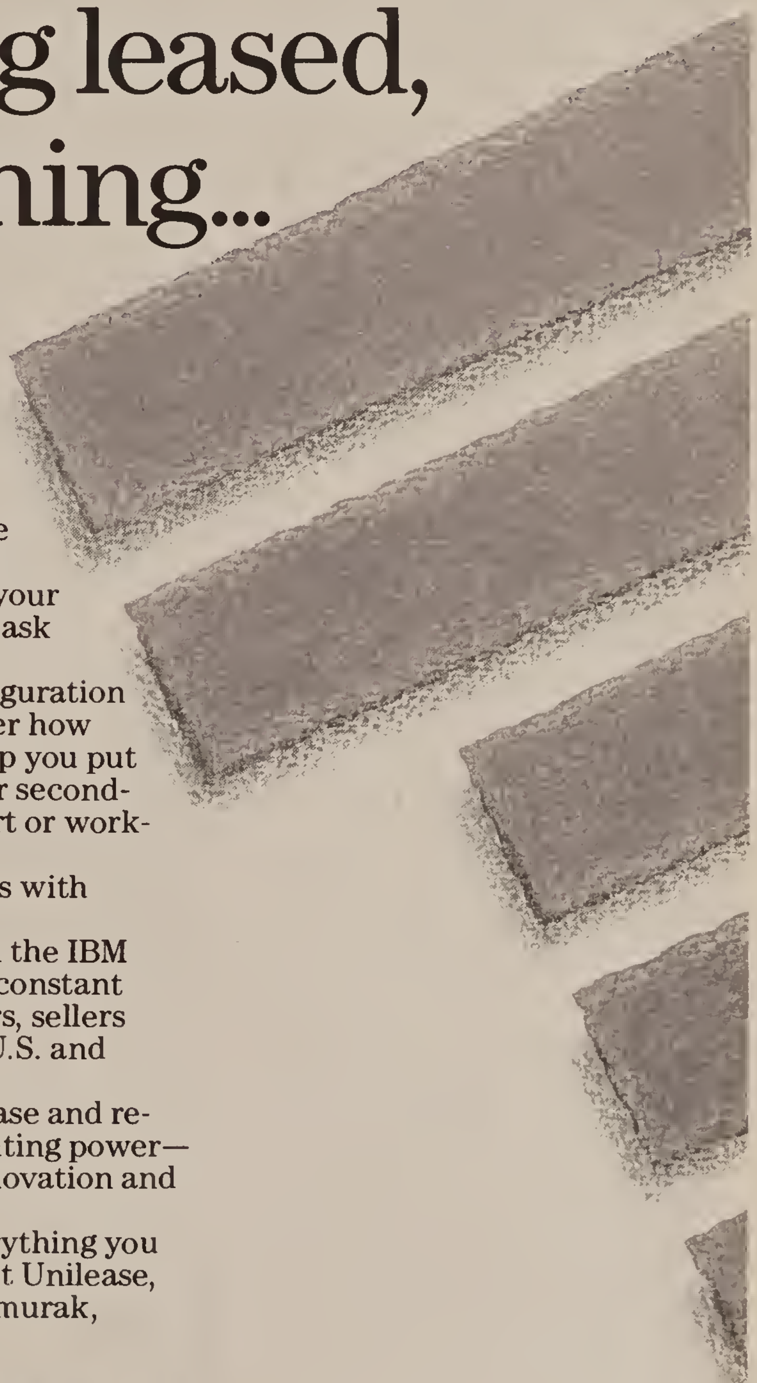
Even systems that already have accelerator cards with faster processors can be speeded up with Polyboost, Root said, because it speeds the flow of information to and from accelerator cards.

Each of Polyboost's three programs can operate independently and be loaded separately. With the disk program, users can define a 5K-byte to 500K-byte disk cache in random-access memory (RAM), which stores the most frequently-accessed information from the disk drives. For systems with expanded or extended memory, the disk cache can be as large as 2.2M bytes.

Polyboost's screen display portion routes data directly to the screen, bypassing some MS-DOS and BIOS routines. This display function is said to provide faster scrolling and text display. The program also eliminates the flicker and flash often caused by IBM Color Graphics Adapter (CGA) cards, Root claimed. Polyboost works with monochrome, CGA and Hercules Computer Technology, Inc. graphics cards.

Polyboost's keyboard-enhancement program increases the size of the keyboard type-ahead buffer from 16 to 128 characters and lets users adjust the key-repeat rate for the cursor and character keys. The program also includes a command line editor for recalling, editing and executing MS-DOS commands.

According to Root, Polyboost is completely compatible with other RAM-resident software, accelerator cards and chips, IBM PC applications software and disk utilities. Other software programs on the market offer disk caching or display improvement, but Root claimed Polyboost is the only program to also speed keyboard input.



Something old, something new, something leased, something...

When you need the perfect mix of IBM equipment to suit your needs and budget, ask Unilease.

Whatever configuration you need, no matter how unique, we can help you put it together—new or second-user, state of the art or workhorse standard.

Make your plans with Unilease.

We're leaders in the IBM leasing market. In constant contact with buyers, sellers and lessors in the U.S. and around the world.

Unilease. We lease and remarket IBM computing power—with flexibility, innovation and resourcefulness.

To find out everything you need to know about Unilease, contact: Teresa Chmurak, (212) 265-1040.

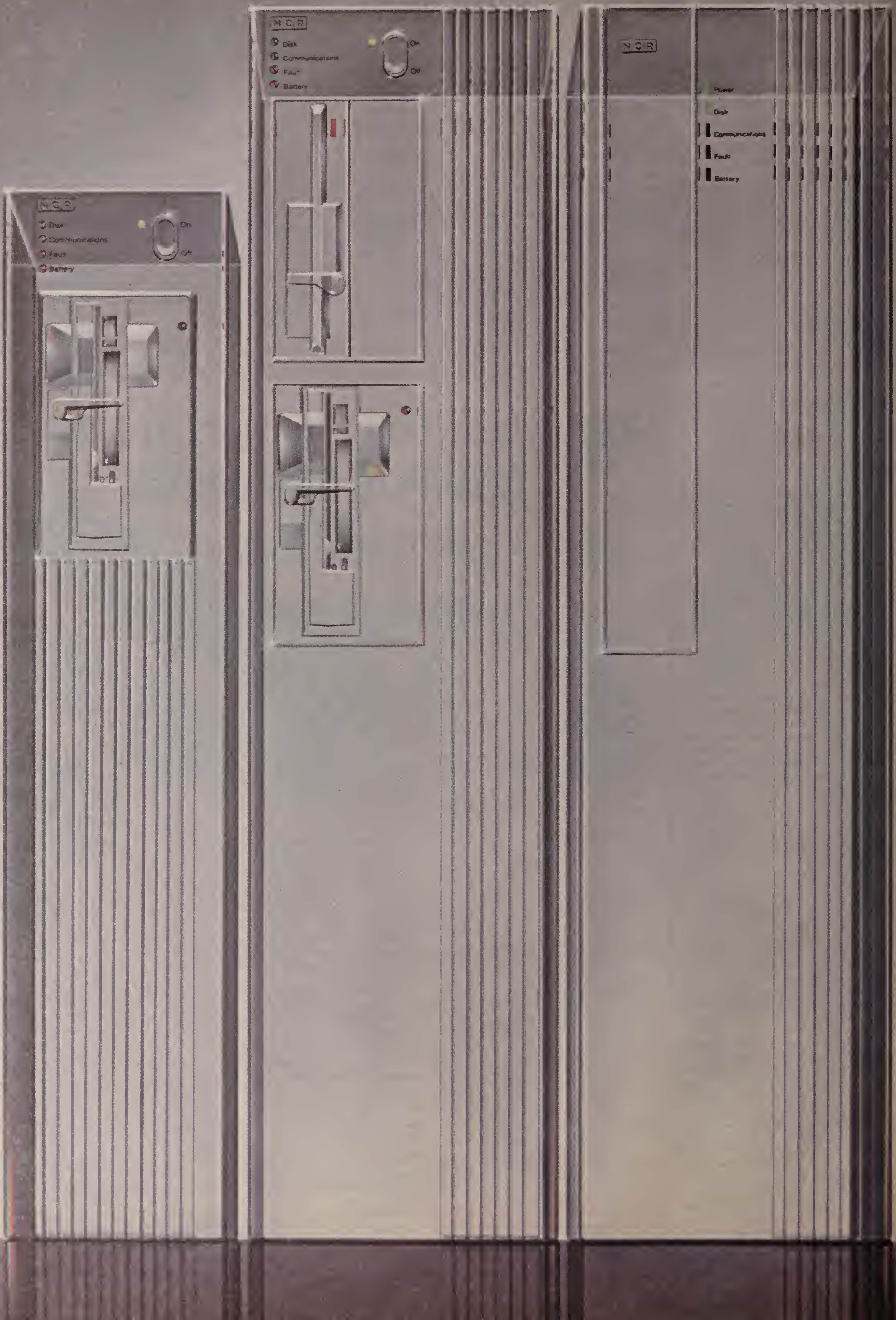
☐ Please send me a copy of "Everything you need to know about Unilease." CW

Name____________________
Title____________________
Company____________________
Street____________________
City__________ State_____ Zip________

Unilease Computer Corporation
1370 Avenue of the Americas
New York, NY 10019
ATTN: Teresa Chmurak

UNILEASE
(212) 265 1040 New York · Orlando · Dallas · Los Angeles · London · Düsseldorf · Paris

© 1986. Unilease Computer Corporation


NCR
Disk
Communications
Fault
Battery
On
Off
NCR
Disk
Communications
Fault
Battery
On
Off
NCR
Power
Disk
Communications
Fault
Battery

OUR ADVANTAGE IN MIGRATION IS CLEAR.

NCR's nit-picking fanatics took a clear-headed approach in designing the NCR Tower® systems. By making Towers fully compatible, from the MiniTower (1-8 users) to the Tower XP (1-16 users) to the Tower 32 (1-32 users), they've provided a clean, clear upward growth path for your customers.

Compatibility across the Tower family lets you easily move your software from one Tower to the other with little alteration. So you can upgrade your customers' systems with a minimum of software maintenance and support.

And just as the Towers communicate fluently with each other, they talk to a host of standard protocols including Ethernet, 2780/3270, SNA and X.25. In fact, industry standards such as UNIX,® Multibus,™ SCSI, RS-232 and others are built into every Tower to allow VARs the flexibility they need.

For your customers, it's the path to greater productivity. For you, it's a road to bigger, more lucrative accounts.

And that's just the beginning.

As your business grows, our comprehensive support programs give you the flexibility you need to keep growing. With everything from lead referral programs and single-source service to technical training and financing for you and your customers. And all the strength of a $4.3 billion corporation at work for you.

Of course, all of this should come as no surprise. It's just another example of our towering commitment to VARs.

At NCR, we've always had your needs clearly in focus.

THE TOWERS.
BUILT FOR SYSTEMS BUILDERS
BY NIT-PICKING FANATICS.

NCR

OEM Systems Division, NCR Corporation, U.S. Data Processing Group, USG-1, Dayton, OH 45479. Nationwide (800) CALL-NCR.

© 1986 NCR Corporation. Tower is a registered trademark of NCR Corporation. Multibus is a trademark of Intel Corporation. UNIX is a registered trademark of AT&T. Specs subject to change.

Intelligence that easily grows on you.

Airline Systems

3270

System 3/X

Telex PBX Systems

Standalone Applications

Telex Intelligent Workstations. High performance microcomputers offering expandability, systems connectivity, and IBM compatibility. While they've become the standard for 3270 subsystem intelligence, that's just the beginning of where they can grow. Because now they're expandable into airline, S/3X, and PBX environments.

Whatever information worlds you are merging, let Telex Intelligent Workstations connect you to the future, today. For more information on Telex products and worldwide service and support call 1-800-331-2623, Ext. 3284. In Oklahoma call 1-918-628-3284.

The #1
3270 Alternative.

TELEX®

TELEX COMPUTER PRODUCTS, INC.

IBM is a registered trademark of International Business Machines Corporation.
Telex is a registered trademark of The Telex Corporation.

Hardware Roundup

Edited by Barbara Wierzbicki

Microcomputers

By DAVID BRIGHT

Compatibility, supplier viability and connectability — in that order — ranked highest in influencing purchase decisions at large corporations.

Business users can now buy an IBM Personal Computer XT-compatible system through mail order for as little as $375, or they can pick one up at a department store for $699.

In more traditional business channels, dealers are stocking up on Compaq Computer Corp.'s souped-up personal computer built around the Intel Corp. 32-bit 80386 microprocessor, while Apple Computer, Inc.'s 1M-byte Macintosh Plus is attracting attention as a serious business tool.

But despite continued competition from low-priced clones, the threat of more powerful machines or anything Apple might do, the microcomputer world still revolves around IBM.

Virtually no business microcomputers are built without IBM Personal Computer compatibility in mind, and that includes the mail-order cheapies as well as the new class of 32-bit machines.

Third-party hardware is available to add IBM PC compatibility to the Macintosh, and even Apple itself is making plans for future IBM PC compatibility.

With the exception of Compaq, which usually keeps its prices on a par with IBM's, the major selling point for most clone manufacturers is lower prices. Despite the fierce price competition among the scores of clones, the price of microcomputers is not the primary concern at large corporations, one study confirmed.

According to a study by the Newton-Evans Research Co. of Ellicott City, Md., compatibility, supplier viability and connectability — in that order — ranked highest in influencing purchase decisions at large corporations. In the survey of 156 companies, price was a major factor in only 3% of the cases.

For these reasons, many large corporations remain firm in their decisions to stick with mainstream products from the likes of IBM and Compaq.

The issue with non-IBM companies is "not only whether they are going to stay around but also how well they will be able to maintain compatibility," agrees Ed Macke, manager of personal computer systems at Northrop Defense Systems Division in Chicago. Macke, who manages 400 IBM PC XTs and ATs, says he has no intention of switching from Big Blue.

In 1985, IBM commanded a 34.3% share of the $13.3 billion U.S. personal computer market, according to International Data Corp. (IDC), a Framingham, Mass., market research firm. Apple was a distant second with a 10.7% share, followed by Compaq with 5.9%. By most estimates, many more than 5 million IBM PC-family systems have been installed worldwide.

Since the last Hardware Roundup 14 months ago, the major developments from IBM have been price cuts to ward off the clones and the introduction of new XT and AT versions, as well as the PC Convertible — Big Blue's first entry in the laptop computer market.

In April, IBM reduced prices on some systems by as much as 25%. For example, the price of a 256K-byte XT with a 10M-byte hard disk drive was cut from $3,895 to $2,895.

In July, Big Blue reduced dealer prices on selected PC and AT models by as much as 18%, and a month later the company cut the direct sales price of its basic 5-year-old PC by as much as 22%.

However, since many of the price cuts were on slower moving systems — such as two older PC models and the 6-MHz PC AT, IBM's slowest AT — many analysts suggested that IBM was essentially conducting a clearance sale to rid itself of its old inventory and to make way for newer systems.

"It's very encouraging that the price is coming down, but I don't want one," says Cheryl Currid, manager of sales, systems, planning and information at Coca-Cola Co. Foods Division in Houston.

With outdated features like a 4.77-MHz Intel 8088 microprocessor, five expansion slots and a 65W power supply, the PC is "not an acceptable business computer," Currid explains. "The problem with the PC is that IBM has the slowest IBM compatible on the market."

For a while, IBM also had one of the slowest AT compatibles on the market. But in April, the computer giant added a faster AT using an 8-MHz Intel 80286 microprocessor, while continuing to sell the original 6-MHz version.

At that time, IBM also announced three new XT models with half-height floppy drives, an optional 20M-byte hard disk drive and room for a full 640K bytes of random-access memory (RAM) on the system board.

But still, a performance gap existed between the PC XT and PC AT.

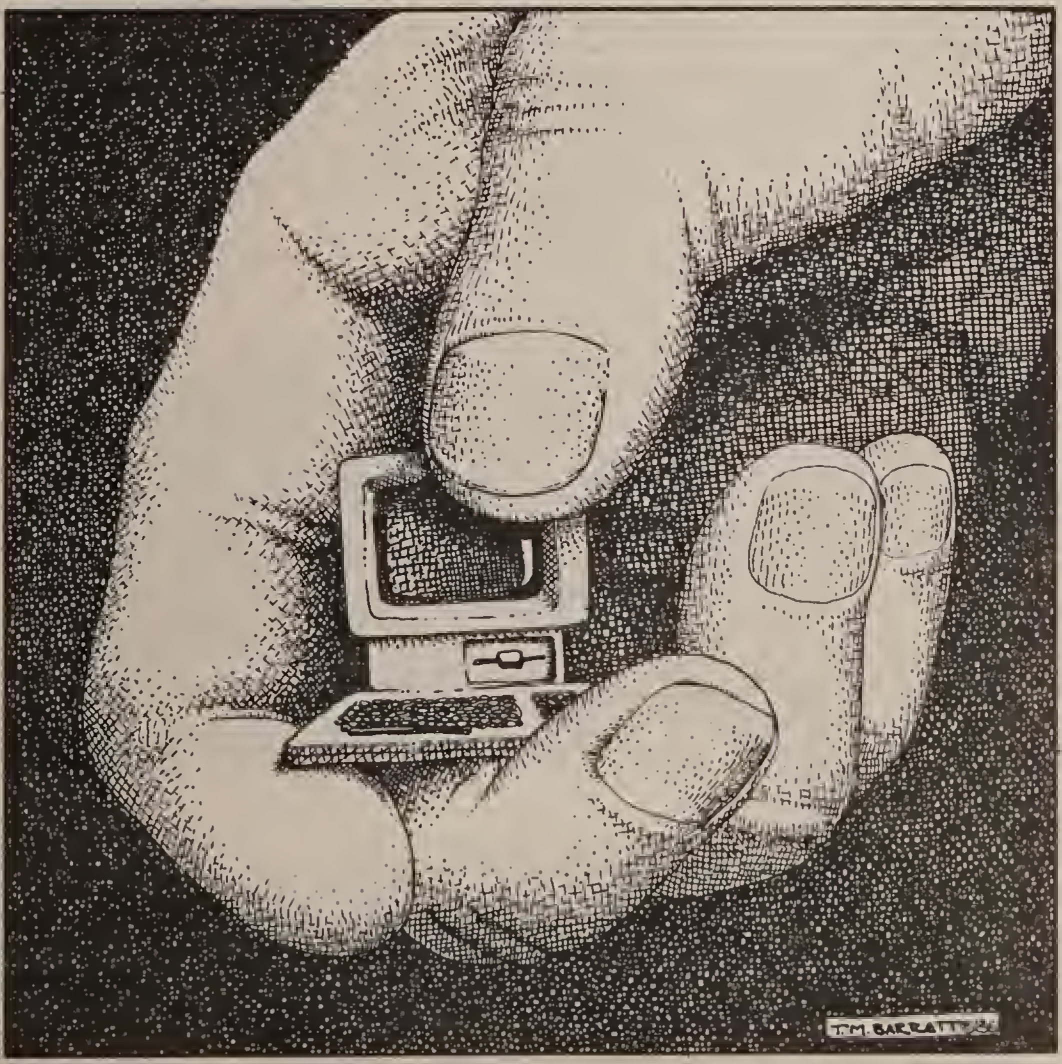


ILLUSTRATION BY TOM BARRETT

Last month, with the introduction of the XT Model 286, IBM moved to fill that gap. Observers say that the arrival of the Intel 80286-based PC XT Model 286 further indicates that the end is near for IBM's line of 8088-based systems.

The XT Model 286 is basically a slightly slower performance AT in an XT box at a lower price. While the $5,295 AT uses an 8-MHz CPU with one wait state and a 30M-byte hard disk drive with a 40-msec access time, the $3,995 XT Model 286 employs a 6-MHz CPU with no wait states and an 85-msec, 20M-byte drive.

Following many months of rumors and speculation, IBM in April introduced its 12-lb PC Convertible laptop system. With prices starting at $1,995, the PC Convertible runs the PC-DOS operating system but uses 3½-in. floppy disk drives instead of the 5½-in. industry standard.

Keeping a close eye on IBM, other microcomputer manufacturers launched systems with increasingly better price/performance ratios and anxiously planned for the next generation of Intel 80386-based machines.

While most large-systems vendors were slow in meeting customer demands for IBM PC-compatible workstations, they have learned their lesson this time around. In their efforts to become single-source suppliers, nearly all of the large systems manufacturers now have PC AT-compatible systems available to their customers.

Activity in the IBM Personal Computer-compatible laptop computer market also increased, with a number of vendors introducing systems with improved displays. Most prominent among those vendors were Data General Corp. and Zenith Data Systems Corp. Wang Laboratories, Inc. is also expected to announce an IBM PC-compatible laptop system by early 1987.

Meanwhile, Compaq shrugged off persistent rumors that the company will soon be introducing a laptop system with a highly readable gas plasma display. What is lacking, Compaq officials maintain, is the technology to squeeze a full-function personal computer into a laptop-size package.

The only laptop system to achieve extraordinary sales so far is Tandy Corp.'s Model 100, a non-IBM-compatible system with a worldwide installed base of more than 135,000, according to IDC.

Typifying the industry trend, Cordata, Inc., a week after IBM's April announcements, added value to and cut prices on its PC- and XT-compatible systems and cut prices on its AT-compatible systems by as much as 33%. For example, Cordata slashed the price of one 640K-byte AT model with a 20M-byte hard disk drive from $5,495 to $3,695.

Citing tough competition and a desire to become a real factor in the marketplace, NEC Information

---

Bright is a Computerworld *senior writer.*

Continued from page 41

Systems, Inc. in August followed suit by dropping prices on its AT-compatible systems by as much as 25%.

Formerly $5,045, an APC IV with 640K bytes of RAM and a 40M-byte hard disk drive is now $3,995. The price cuts came after a steady decline in NEC's annual shipments — from 13,500 in 1983 to 10,020 in 1984 and 9,130 in 1985, according to IDC figures.

> ***Despite continued competition from low-priced clones, the threat of more powerful machines or anything Apple might do, the microcomputer world still revolves around IBM.***

One new AT-compatible system that has received high marks for its price/performance ratio is Televideo Systems, Inc.'s Telecat-286. For $2,995, the Telecat-286 comes with 512K bytes of RAM, selectable 6-MHz or 8-MHz clock speeds as well as a 20M-byte hard disk drive. A version with a 30M-byte drive is also available.

While the clone manufacturers were escalating their price war, Apple in September cut the prices of its Macintosh systems. The Macintosh Plus was reduced from $2,599 to $2,199, and the Macintosh 512K Enhanced dropped in price from $1,999 to $1,699.

Deftly sidestepping the clone price wars, Compaq catapulted into the Fortune 500 by sticking close to the IBM standard and at the same time adding extra value to its machines.

Tired of waiting for IBM, Compaq last month broke from that tradition by introducing an Intel 80386-based system before IBM did.

Targeted for such computation-intensive applications as engineering, software development and large spreadsheets, the Deskpro 386 reportedly runs existing Microsoft Corp. MS-DOS programs two to three times faster than an IBM AT.

Prices start at $6,499 for a system with a 40M-byte hard disk drive and at $8,799 for a system incorporating a 130M-byte disk drive.

In addition to a 16-MHz 80386, the Deskpro includes such improvements as static column memory and faster, higher capacity hard disk drives. However, no operating system yet exists to take full advantage of the 80386's advanced capabilities, such as addressing huge amounts of virtual memory.

So, for the time being, Deskpro 386 users must make do with the same MS-DOS that runs on AT-class machines. The system runs Microsoft's Xenix V/286 version of Unix, which makes better use of the 80386 chip and which supports multiple users. In early 1987, Microsoft is expected to have the Xenix V/386 ready.

But MS-DOS will be the dominant personal computer operating system on the Deskpro 386. "You'll continue to see DOS as the standard for individual personal computer applications, and you'll see various versions of Unix in the other segment, such as multiuser applications and [engineering] workstations," said Compaq Marketing Vice-President Mike Swavely last July.

If IBM should come out with an 80386-based PC, then the Deskpro 386 would likely have to be re-engineered to ensure compatibility. Given that scenario, the Deskpro 386 might seem to be a rather risky proposition, but it is unclear when — or whether — IBM will announce such a machine.

Meanwhile, a handful of other companies, such as Corvus Systems, Inc. and Advanced Logic Research, have already introduced systems built around the new chip.

In addition, Wyse Technology, Inc. and several other companies are believed to have Intel 80386-based machines waiting in the wings. "Anybody who announces a 386 PC at this juncture, before IBM makes its move, should have their head examined," comments Marty Gruhn, vice-president of The Sierra Group, a market research firm based in Tempe, Ariz.

While it was challenging IBM with new technology, Compaq also continued to strive for price/performance leadership against existing IBM machines. One day after IBM introduced its $3,995 XT Model 286, Compaq announced a comparably equipped machine for $3,999.

At the same time, Compaq cut the price of its entry-level Deskpro 286 system by 25%, from $3,999 to $2,999.

According to Compaq's Swavely, the new Deskpro 286 Model 20 offers two key advantages over the XT Model 286: greater speed and a greater capacity for storage devices. Using an 8-MHz 80286 microprocessor with two wait states, the Deskpro 286 Model 20 should run approximately 10% faster than the IBM system, Swavely claims.

The Compaq system has room for four storage devices, compared with the three available in the IBM system. One of those four devices

Continued on page 47

"We use DesignAid and LifeCycle Manager to help our clients develop quality software faster and more cost-effectively."

"Coopers & Lybrand is helping clients build current, proven information technology solutions by combining advanced software tools and techniques with our systems development expertise and experience.

For software tools, we selected Nastec's DesignAid® and LifeCycle Manager®. These products help *automate* our Strategic Systems Planning and Systems Development consulting services.

Our goal is to provide *complete* system solutions that our clients can maintain and enhance on their own. DesignAid is a powerful tool because it automates structured analysis and design, validates and balances data flow diagrams, and supports multiple design techniques.

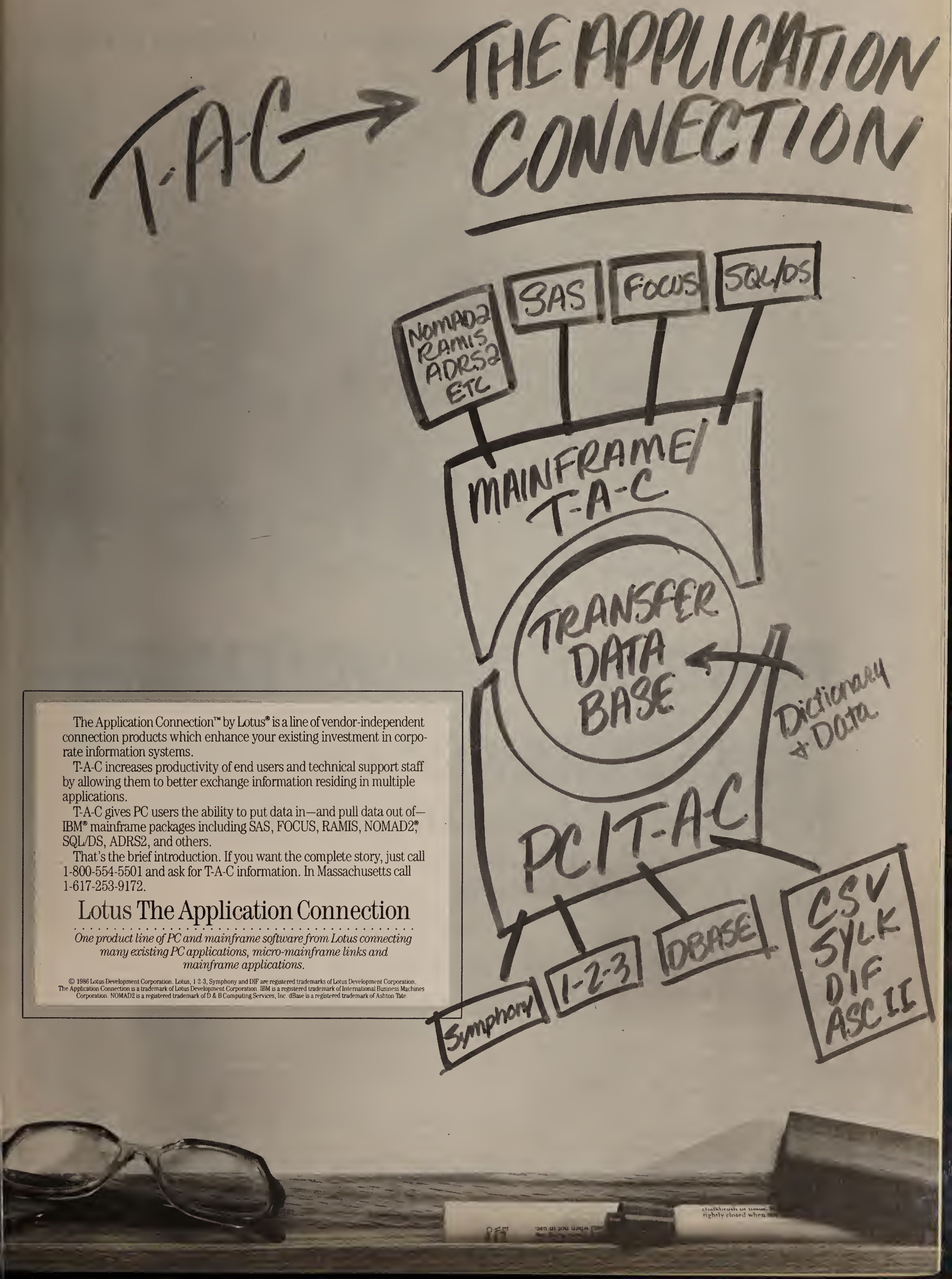
A primary advantage of DesignAid is the way it can be integrated with LifeCycle Manager, which supports project managers with planning, estimating and control features. Together, these two products *automate* our Systems Planning and Systems Development methodologies.

By combining DesignAid and LifeCycle Manager with our own systems development resources, we are helping clients develop quality information systems solutions faster and easier. And that's what our business is all about."

Michael Bealmear, Partner,
National Director of
Systems Services Consulting,
Coopers & Lybrand

For information on how DesignAid and LifeCycle Manager can improve your systems development process, call Nastec, the Leader in Computer-Aided Software Engineering.

NASTEC
CASE 2000
Nastec Corporation
24681 Northwestern Highway
Southfield, Michigan 48075
313-353-3300 / 800-872-8296



The Application Connection™ by Lotus® is a line of vendor-independent connection products which enhance your existing investment in corporate information systems.

T-A-C increases productivity of end users and technical support staff by allowing them to better exchange information residing in multiple applications.

T-A-C gives PC users the ability to put data in—and pull data out of—IBM® mainframe packages including SAS, FOCUS, RAMIS, NOMAD2,® SQL/DS, ADRS2, and others.

That's the brief introduction. If you want the complete story, just call 1-800-554-5501 and ask for T-A-C information. In Massachusetts call 1-617-253-9172.

Lotus The Application Connection

One product line of PC and mainframe software from Lotus connecting many existing PC applications, micro-mainframe links and mainframe applications.

© 1986 Lotus Development Corporation. Lotus, 1-2-3, Symphony and DIF are registered trademarks of Lotus Development Corporation. The Application Connection is a trademark of Lotus Development Corporation. IBM is a registered trademark of International Business Machines Corporation. NOMAD2 is a registered trademark of D & B Computing Services, Inc. dBase is a registered trademark of Ashton Tate.

Sun, Apollo, DEC face off in engineering workstation arena

By ROSEMARY HAMILTON

Since January, there have been dozens of products rolled out, revamped, repositioned or reduced in price in the engineering workstation market. And users are not likely to get much of a reprieve from this hectic pace.

With the recent introduction of a faster 32-bit microprocessor from Motorola, Inc. and the current development work under way for workstations expected to process at speeds in excess of 20 million instructions per second (MIPS), a new generation of products could be ushered in early next year.

The new chip, the Motorola 68030, and the multiple MIPS machines will only fan the competitive fire that has been raging this year as Apollo Computer, Inc., Sun Microsystems, Inc. and Digital Equipment Corp. fight for market share.

In addition to these three vendors, there are a number of OEMs, such as Mentor Graphics Corp., Daisy Systems Corp. and Valid Logic Systems, Inc., as well as other vendors — the most notable of which is Hewlett-Packard Co. — competing for market share, but the primary battle throughout the past year has evolved around the trio of Apollo, Sun and DEC.

And this battle has greatly changed the market in one year's time. A year ago, a typical workstation cost between $35,000 and $50,000. Today, the three vendors offer workstations in the $15,000 to $40,000 range, although fully configured systems still cost in excess of $50,000.

In addition, the most powerful general-purpose engineering workstation had a 1- to 2-MIPS rating a year ago. With the recent high-end workstation introduction from Sun, the new top rating for the general-purpose workstation market is 4 MIPS.

One year from now, vendors are certain to have incorporated the new Motorola 68030 microprocessor in their workstation offerings. The chip, with an 8-MIPS rating, is reportedly twice as fast as the current high-end Motorola microprocessor. In addition, the Dana Group, a start-up firm in Palo Alto, Calif., has plans to introduce a "personal supercomputer" for engineers in mid-1987. The workstation, which will reportedly process at a rate of 20 to 30 MIPS, is expected to be priced in the $70,000 to $80,000 range.

The workstation competition has been heating up since 1982, when Sun introduced its workstations for a market that had been pioneered by Apollo, which introduced the concept of stand-alone systems dedicated to engineering tasks in 1980.

But the competition intensified in the early months of 1986. In January, IBM made its long-awaited entry into the market with the announcement of the RT Personal Computer.

One week prior to the RT PC's introduction, DEC made a major push into the market with its Vaxstation II/GPX series, and Sun added a low-end model with a base price of $7,900, one of the least expensive workstations in the industry. Less than one month after the IBM RT PC announcement, Apollo came out with a number of new models that effectively replaced its existing line.

But the RT PC, much to the relief of other workstation vendors, received a lukewarm reception in the market, and it was not considered a strong contender to offerings from Apollo, Sun and DEC.

"The most significant event of 1986 was a nonevent — the introduction of the RT," said Richard Shaffer, editor and publisher of *Technologic Computer Letter*, a Technologic Partners newsletter. "To hear most of the pundits talking, you would have thought that IBM was going to walk away with the workstation market the moment they decided to enter it. Lots of customers held off buying until they saw what IBM was going to do. When they saw what kind of a turkey IBM really had in the RT, they went ahead and bought whatever it was they had planned to buy in the first place."

So the real fight, it seemed, would concern the workstation trio, and the three drew out their guns again at summer's end. Apollo, with its successful DN3000 color and monochrome models, was challenging Sun in the low end of the market, which had been Sun's stronghold. In August, Sun responded with a color low-end model to push back the color DN3000.

Along with the low-end model, Sun introduced a high-end system that was the first workstation to incorporate the Motorola 68020 microprocessor with a 25-MHz clock speed. A week later, Apollo introduced enhanced models at its high end. DEC, meanwhile, increased the standard memory configuration on some of its models and trimmed the prices on others.

Then in September, IBM added a number of enhancements to its RT PC in the areas of communications and storage and dropped the price to make it more competitive with other workstation offerings. Industry analysts considered this a positive step, but they also suggested that the RT is still not a serious threat to other workstation offerings. ■

Hamilton is a Computerworld *senior writer.*

FIRST PUBLIC DEMONSTRATION
OF THE
VOICE SYSTEM SPECIFICATION
feature of The Intelligent Assistant
WILL BE HELD AT
Digital Consulting, Inc. (617) 470-3880
1986 National Database and 4th Generation Language Symposium
October 27 - 30, 1986 in Dallas, Texas

The Intelligent Assistant (TIA) is a Business System Definition Language for online, batch and DBMS applications on IBM mainframes that:

- Creates the detailed system design
- Generates 100% of the ANSI Cobol (structured)
- Thoroughly documents the entire application
- Produces the JCL
- Delivers the application ready to system test IN MINUTES! — IN ONE CPU PASS.

MAINTENANCE — ENHANCEMENTS — PROTOTYPING
can now be accomplished by VOICE COMMANDS.

If you cannot attend but would like more information please contact:

LSTC
Leading Software Technologies Corporation
26250 Euclid Avenue Suite 307
Cleveland, Ohio 44132
(800) 222-LSTC or (216) 261-0187

Talk is Cheap! If you can talk about it — The job is done.

CCI'S OFFICEPOWER® SYSTEMS WILL EAT THE LUNCH OF ANY COMPUTER OR OFFICE SYSTEM FROM...

LET US SHOW YOU WHY. CALL 800-345-1942.

In California, call 800-237-4552.

OFFICEPOWER systems run fully integrated office automation on ultra-fast, UNIX-based superminis with the best price/performance in the industry. CCI systems incorporate industry-standard communications and database management options. Our technology base is built on years of success in large fault-tolerant database systems closely coupled to communications networks.

CCI COMPUTER CONSOLES INCORPORATED

OFFICEPOWER is a registered trademark of Computer Consoles, Inc. UNIX is a registered trademark of AT&T.
IBM is a registered trademark of International Business Machines Corporation. DEC is a registered trademark of Digital Equipment Corporation.
Wang is a registered trademark of Wang Laboratories, Inc.

Announcing a personal computer for those who like to work in the fast lane.

The new IBM® Personal Computer XT™ Model 286 is powered by the high-performance 80286 microprocessor.

And that means it's fast.

Up to three times faster than the original IBM PC.

So you can race through complex spreadsheets and sort through mountains of data. While saving valuable time.

More power under the hood.

Speed isn't the only thing the PC XT Model 286 delivers.

There's power.

And plenty of it. For the PC XT Model 286 comes equipped with a full 640 KB of memory. Which you can easily extend to 12.6 MB.

With this much memory—and IBM's TopView,® for example—you can run and "window" several of the most sophisticated business programs at once.

Some powerful features.

The IBM PC XT Model 286 also comes complete with a variety of impressive features.

Like a 20-megabyte "hard file," for storing large volumes of information. A 5.25-inch, 1.2 MB diskette drive. (If you choose, you can add another 5.25″ or 3.5″ diskette drive.) Plus an enhanced IBM keyboard, for easier data entry and word processing.

Only the highest standards.

Of course, the IBM name assures you of several important standard features, too.

Such as IBM service and support. IBM quality.

Not to mention, IBM reliability. Which assures you that every product is thoroughly tested and inspected prior to shipment.

Great performance and economy.

Now you would expect all this additional speed and power to cost a lot of additional money.

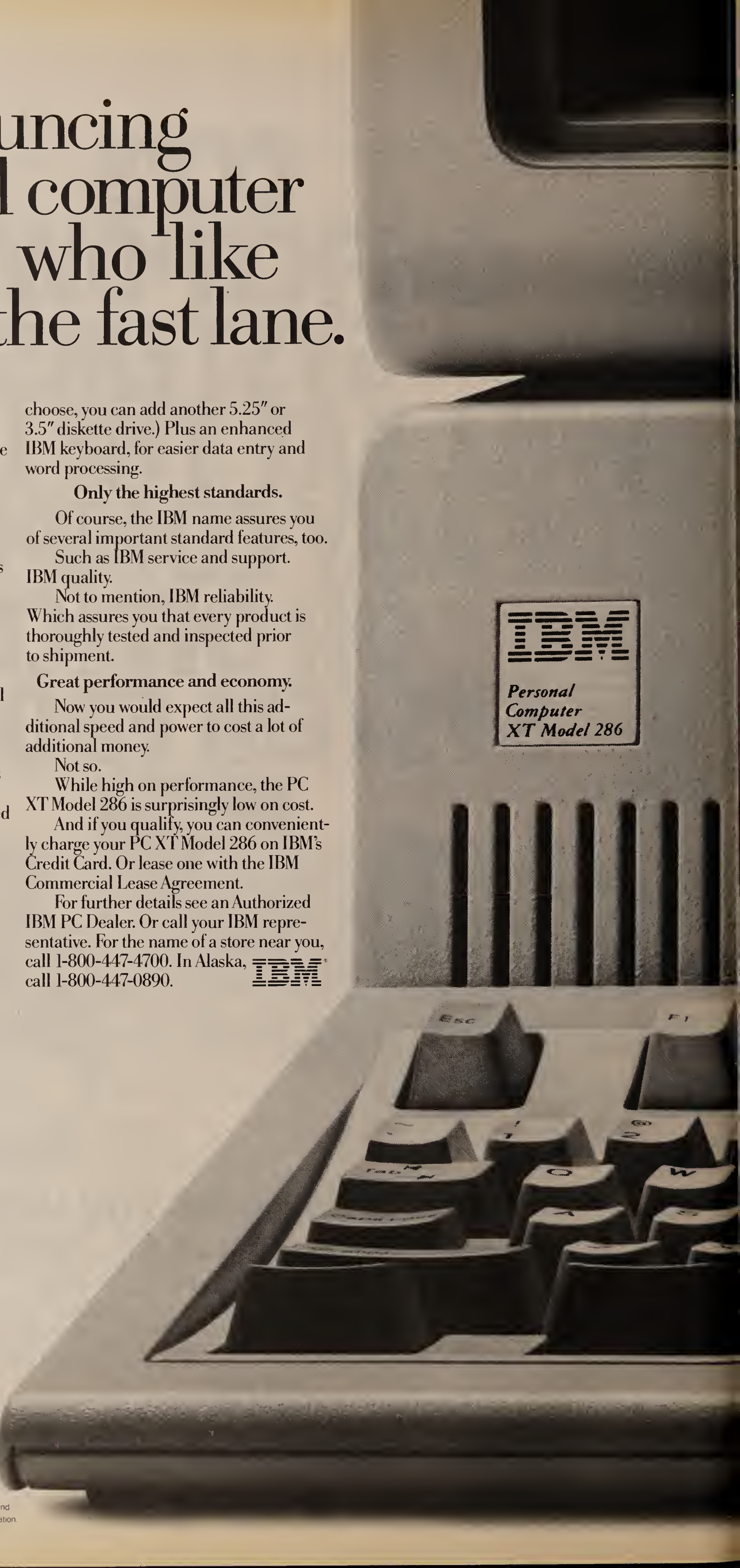
Not so.

While high on performance, the PC XT Model 286 is surprisingly low on cost.

And if you qualify, you can conveniently charge your PC XT Model 286 on IBM's Credit Card. Or lease one with the IBM Commercial Lease Agreement.

For further details see an Authorized IBM PC Dealer. Or call your IBM representative. For the name of a store near you, call 1-800-447-4700. In Alaska, call 1-800-447-0890.

IBM®



Little Tramp character licensed by Bubbles Inc., s.a.

© Copyright IBM Corporation 1986. IBM and TopView are registered trademarks, and Personal Computer XT is a trademark, of International Business Machines Corporation.

Roundup '86 setup

This year's Hardware Roundup was compiled by *Computerworld* using questionnaires mailed to vendors of personal computers and small, medium-scale and large systems. Where possible, International Data Corp.'s (IDC) definitions for these categories were used to place systems in groups with likely competitors.

This week we conclude the Hardware Roundup with a look at microcomputers. The 32-bit workstations aimed at the technical/engineering market are listed as a separate category in the microcomputer chart.

In cases where vendors did not supply the requested information, *Computerworld* has filled in the blanks using earlier vendor literature or statements. Responses listed as "NA" are instances in which a manufacturer failed to answer a question or the question did not apply to a vendor's system. The survey primarily focuses on the major PC vendors and is not an exhaustive list.

Continued from page 42

can be a backup tape drive, an internal option not offered by IBM.

Responding to customer demands, Digital Equipment Corp., Data General and Tandem Computers, Inc. all introduced AT-compatible workstations with the ability to link to those vendors' larger systems.

With its $4,065 Vaxmate workstation introduced just last month, DEC strengthened its commitment to networking and finally provided its customers with a system conforming to the IBM Personal Computer standard.

The basic Vaxmate includes a built-in Ethernet connection and a Microsoft Windows interface for exchanging files with a VAX or with a Microvax system. An expansion box that has a 20M-byte hard disk drive is optional.

> ***Maintaining PC compatibility will soon become more difficult as IBM begins a series of hardware and software improvements.***

AT&T, Hewlett-Packard Co., Honeywell, Inc.'s Information Systems, NCR Corp., Sperry Corp. and Wang also offer AT-class systems with tie-ins to the vendors' proprietary minicomputers and mainframes.

Although Burroughs Corp. has been successful with its B25 family of workstations, which run the company's proprietary BTOS multitasking operating system, the company may also be gearing up for some sort of AT-class device, hints Jim Smith, product marketing manager for workstations at Burroughs. So far, more than 56,000 B25 units have been installed, according to IDC estimates.

Although an increasingly large percentage of hardware vendors currently offer IBM Personal Computer compatibility, maintaining that compatibility will soon become more difficult as IBM begins a series of hardware and software improvements.

Such improvements include use of the 80386 microprocessor, proprietary gate array chips and proprietary operating system additions to multitasking versions of MS-DOS.

The IBM PC-compatible ranks will dwindle, with the only survivors being vendors like Compaq and Tandy, which have the financial means to keep pace. ■

Yes, there is a low-cost multiplexer
that will stay that way.

Statistical multiplexers take data formerly transmitted over many phone lines and send it over just one. The right mux will save you plenty of time and money, even with as few as two terminals. The wrong one will cost you plenty, in downtime, service calls, and scrambled transmissions.

We make the right ones...a complete line of low-cost muxes for your minicomputer network. We're Codex, the Motorola company that introduced stat muxing technology ten years ago. We offer you virtually error-proof transmission, support for both asynchronous and synchronous protocols, expert help in setting up your system, literature you can actually understand, reliable service programs, and expandability from just a few terminals to several hundred.

We help you keep accurate data flowing to and from your company's remote offices. Reliably, cost-efficiently, and with a minimum of fuss. Who says so? Our customers, and independent industry surveys rating us first in technology, service, literature, price/performance ratio, and brand preference.

For more information about our complete line of economical stat muxes, call **1-800-426-1212, ext. 245.** Or write Codex Corporation, Dept. 707-45, 20 Cabot Boulevard, Mansfield, MA 02048.

codex
Ⓜ MOTOROLA

See us at the Motorola/ISG booth at COMDEX, November 10-14.

© Copyright 1986 Codex Corporation. Motorola and Ⓜ are trademarks of Motorola, Inc. Codex is a registered trademark of Codex Corporation.

WHAT TO LOOK FOR IN A DIAL-UP MODEM 1-800-822-8224

19,200 bps.

Microcom puts its cards on the table. Announcing the PC/9624c card modem. The world's fastest internal modem for your IBM™ PC or compatible personal computer. And two other card modems that are the fastest in their class. The PC/2400c and PC/2400.

The new PC series is the only modem card family that delivers speeds up to 19,200 bps. 100% error free.

But don't make the mistake of thinking the world's fastest and most accurate modems exact a heavy toll on your monthly phone bill. Exactly the opposite is true.

YOU GET WHAT YOU PAY FOR.

Comparative costs of sending 360,000 bytes of data over dial-up phone lines.

Product	Throughput	Transfer Time	Cost of call ($20/hr)
Generic Modem	2400 bps	25 min.	$8.33
PC/2400	**2900 bps**	**20 min., 41 sec.**	**$6.90**
PC/2400c	**5000 bps**	**12 min.**	**$4.00**
PC/9624c	**9600 bps**	**6 min., 15 sec.**	**$2.08**
PC/9624c	**19,200 bps**	**3 min., 7 sec.**	**$1.04**

Modem Card.

Our new PC card modems give you everything you expect from a Microcom modem. Microcom is the leader in dial-up error-correction technology and the inventor of MNP™ – Microcom Networking Protocol™ – the recognized industry standard.

The new PC card modems from Microcom. Call us for the inside story. 1-800-822-8224 (In MA dial 617-762-9310).

- *Hayes™ compatible*
- *CCITT V.22 bis compatible*
- *Upgradeable*
- *Standalone configurations available*

IT'S ALL IN THE CARDS. Send for complete details on the PC/9624c, PC/2400c and PC/2400. Mail to Microcom, 1400 Providence Highway, Norwood, MA 02062.

Name Phone

Title Company

Address

City State Zip

MICROCOM™

Microcom, MNP and Microcom Networking Protocol are trademarks of Microcom, Inc. Hayes is a trademark of Hayes Microcomputer Products. IBM is a trademark of International Business Machines.

MICROCOMPUTERS

Company/ Product	CPU	Clock Speed (MHz)	Operating System	Random-Access Memory (Range in Bytes)	Disk Storage	Number of Expansion Slots	Number of I/O Ports	Monitor Support/ Resolution in Pixels	Price
Apple Computer, Inc. 20525 Mariani Ave. Cupertino, Calif. 95014 *Apple Macintosh 512K Enhanced*	Motorola, Inc. 68000	7.8336	Macintosh OS	512K-1M	400K-800K bytes	0	7	Monochrome: 512 by 342	$1,699
Apple Macintosh Plus	68000	7.8336	Macintosh OS	1M	800K bytes	0	7	Monochrome: 512 by 342	$2,199
AT&T 1 Speedwell Ave. Morristown, N.J. 07960 *PC 6300*	Intel Corp. 8086	6	Microsoft Corp. MS-DOS	256K-640K	360K bytes (10M-byte hard-disk option)	7	2	Monochrome: 640 by 400	$2,645
PC 6300 Plus	Intel 80286	6	MS-DOS, AT&T Unix System V	512K-7M	Two 1.2M-byte floppies (20M-byte hard-disk option)	7	2	Monochrome: 640 by 400	$5,095
Burroughs Corp. 1 Burroughs Place Detroit, Mich. 48232 *B26*	Intel 80186	8	BTOS	256K-1M	20M-160M bytes	0	4	Color, monochrome: 720 by 348	$3,060
B27	80186	8	BTOS	512K-1M	20M-80M bytes	0	4	Color, monochrome: 792 by 480	$2,895
B28	80286	8	BTOS	1M-4M	20M-160M bytes	0	4	Color, monochrome: 720 by 348	$4,695
Compaq Computer Corp. 20555 FM 149 Houston, Texas 77070 *Compaq Deskpro*	8086	7.14/ 4.77	MS-DOS	128K-640K	20M bytes	4/6	4	Monochrome: 720 by 350	$2,144
Compaq Deskpro 286 Model 1	80286	6-8	MS-DOS, Microsoft Xenix System V/ 286	256K-8.1M	20M-70M bytes	4/5	4	Monochrome: 720 by 350	$2,999
Deskpro 286 Model 20	80286	8	MS-DOS, Xenix	640K-8.1M	1.2M-byte floppy, 20M-byte hard disk	6	4	Monochrome: 720 by 350	$3,999
Deskpro 386	Intel 80386	16	MS-DOS, Xenix	1M-14M	1.2M-byte floppy, 40M-byte hard disk (130M-byte hard-disk option)	5/6	4	Color, monochrome: 720 by 350	$6,499
Compaq Plus	Intel 8088	4.77	MS-DOS	128K-640K	10M-byte hard disk	2	3	Monochrome: 720 by 350	$3,199
Compaq Portable	8088	4.77	MS-DOS	256K-640K	Two 360K-byte floppies	3	3	Monochrome: 720 by 350	$2,199
Compaq Portable II	80286	6-8	MS-DOS	256K-4.1M	10M-20M bytes	2	4	Monochrome: 720 by 350	$3,499
Compaq Portable 286	80286	6-8	MS-DOS, Xenix System V/286	256K-2.6M	20M-byte hard disk	3	4	Monochrome: 720 by 350	$4,299
Cordata, Inc. 275 E. Hillcrest Drive Thousand Oaks, Calif. 91360 *Portable PC, Desktop PC series*	8088	4.77	MS-DOS	512K	Two 360K-byte floppies, 20M-byte hard disk	4	2	Color, monochrome: 640 by 400	$1,495-$1,995
AT Portable series	80286/ 80287	8	MS-DOS	512K	1.2M-byte floppy, 20M-byte hard disk	5	2	Color, monochrome: 640 by 400	$2,995
AT Desktop series	Intel 80287	8	MS-DOS	640K	1.2M-byte floppy, 20M/40M-byte hard disk	6	2	Color, monochrome: 640 by 400	$2,795-$6,995
Data General Corp. 4400 Computer Drive Westboro, Mass. 01580 *DG/One Models 1, 2*	Intel 80C88	4	MS-DOS, Digital Research, Inc. CP/M 86	128K-640K	Up to 10M bytes	0/2	2	LCD display	From $1,495
Dasher/One	Intel 8088-2	4/8	MS-DOS	256K-640K	720K-byte floppy, 10M-byte hard disk	3	1	Monochrome: 640 by 400	$1,990-$4,170
Dasher 286	80286	10	MS-DOS	640K-1.2M	1.2M-byte floppy	6	3	Monochrome: 640 by 350 (color option)	$3,395-$4,095
Digital Equipment Corp. 146 Main St. Maynard, Mass. 01754 *DEC Vaxmate*	80286	8	MS-DOS	1M	1.2M-byte floppy (20M-byte hard-disk option)	NA	NA	Monochrome	$4,065

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

CW chart compiled by Barbara Wierzbicki and David Bright.

[1] External expansion box with five slots available as an option.

[2] Also available in single drive. Hard disks are offered as accessories.

[3] Option upgrade to the PT200 terminal priced at $1,995.

[4] Disk storage is expandable to include two floppy disk drives and one hard disk drive or one floppy disk and two internal hard disk drives.

Motorola
Introduces
Peaceful
Coexistence.

Our new family of supermicros can end the incompatibility battles between vendors. Between architectures. Between MIS/DP and the end user. Even between new systems and old.

For example, the new VISION/32 system is uniquely capable of letting you expand or coexist with your current VISION-based Motorola systems easily and painlessly. With no major breaks in operation. And no loss of investment.

The open architecture and open operating system of our new supermicros also allow them to peacefully coexist within most environments, including IBM. And within multi-vendor solutions.

Few other systems, if any, give you as great a number of choices in software and peripherals. And right now, from a variety of manufacturers, there are more than 1500 plug-in boards to interface with the VMEbus for added features and functionality.

And with our networks and communications capabilities, entire departments can coexist. Share information and peripherals. And communicate. With each other. With other departments. Even with the headquarters mainframe.

Whether you're an end user or VAR. Big or small. We can configure a multi-user, multi-tasking, multi-vendor system that will make everyone happy. Think of us not just as computer manufacturers but as consultants. The Peacemaker in the Computer Wars.

Take the first step toward peace. Write us at 10700 N. De Anza Blvd., M/S 42-20A, Cupertino, Calif. 95014. Or contact us toll-free at 800-262-4488, ext. 731 (in California, 800-252-4488, ext. 731).

MOTOROLA
Computer Systems

VISION is a registered trademark of Motorola Computer Systems, Inc.
Motorola Computer Systems, Inc. is a subsidiary of Motorola Inc.
Motorola and the Motorola logo are registered trademarks of Motorola Inc.
IBM is a registered trademark of International Business Machines, Inc.

Company/ Product	CPU	Clock Speed (MHz)	Operating System	Random-Access Memory (Range in Bytes)	Disk Storage	Number of Expansion Slots	Number of I/O Ports	Monitor Support/ Resolution in Pixels	Price
Grid Systems Corp. 2535 Garcia Ave. Mountain View, Calif. 94043 *Gridcase Model 1252*	8086	4.77	MS-DOS, Grid-OS	128K-640K	720K bytes	Option¹	6	Built-in LCD	$2,595
Gridcase Model 1260	8086	4.77	MS-DOS, Grid-OS	128K-640K	720K bytes	Option¹	6	Built-in gas plasma screen	$3,125
Hewlett-Packard Co. 1000 N.E. Circle Blvd. Corvallis, Ore. 97330 *Vectra PC*	80286	8	Microsoft MS-DOS	640K-3.6M	1.2M-byte floppy, 20M-byte hard disk	7	1	Color, monochrome: 640 by 400	$3,099
HP Portable	80C86	5.33	MS-DOS	256K-1.28M	1.28M bytes	2	2	LCD display	$2,695-$2,995
IBM Contact local IBM sales representative *Personal Computer*	8088	4.77	PC-DOS	256K-640K	One or two 360K-byte floppies	5	NA	Color, monochrome: 640 by 350	$1,495
Personal Computer XT	8088	4.77	PC-DOS	640K	360K bytes, 20M-byte hard disk	8	8	Color, monochrome: 640 by 350	$2,895
PC XT Model 286	80286	6	PC-DOS	640K-12.6M	1.2M bytes, 20M-byte hard disk	8	8	Color, monochrome: 640 by 350	$3,995
Personal Computer AT	80286	8	PC-DOS, Xenix	512K-15.5M	1.2M bytes, 30M-byte hard disk	8	8	Color, monochrome: 640 by 350	$5,295
ITT Information Systems 2350 Qume Drive San Jose, Calif. 95131 *ITT Xtra series*	8088	4.77	DOS	256K-640K	Two 360K-byte floppies-20M bytes	5	2	Color, monochrome: 720 by 348	$1,395-$2,345
ITT Xtra XP series	80286	6	DOS	512K-1.2M	10M-20M bytes	5	2	Color, monochrome: 720 by 348	$2,995-$3,125
ITT Xtra XL series (multiuser systems)	80286	6/8	DOS, Xenix V.2	640K-16M	42M-144M bytes	9	Up to 8	Color, monochrome: 720 by 348	$5,299-$12,299
Kaypro Corp. 533 Stevens Ave. Solana Beach, Calif. 92075 *Kaypro PC, PC-10*	8088	4.77	MS-DOS	256K	Two 360K-byte floppies/20M-byte hard disk	9	2	Monochrome: 720 by 348	$1,595-$1,695
Kaypro 2000	8088	4.77	MS-DOS	768K	720K bytes	NA	1	LCD screen	$1,995
Kaypro 286i Models A, C	80286	8	MS-DOS	512K-15M	1.2M-30M bytes	7-8	Up to 4	Monochrome: 720 by 348	$2,495-$3,995
Leading Edge Hardware Products, Inc. 225 Turnpike St. Canton, Mass. 02021 *Model D*	8088	4.77	MS-DOS	512K	Two 360K-byte floppies (10M-40M-byte hard-disk option)	4	4	Color, monochrome	$1,295
NCR Corp. Personal Computer Division 1601 S. Main St. Dayton, Ohio 45479 *NCR PC6 series*	8088-2	4.77/8	NCR DOS	256K-4M	20M-40M bytes	8	2	Color, monochrome: 640 by 400	$2,240
NCR PC4i series	8088	4.77	NCR DOS	256K-640K	Up to 10M bytes	8	2	Color, monochrome: 640 by 400	$2,465
NCR PC8 series	80286	6/8	NCR DOS, Xenix	256K-8M	20M-64M bytes	8	Up to 2	Color, monochrome: 640 by 400	$3,395
NEC Information Systems 1414 Massachusetts Ave. Boxboro, Mass. 01719 *APC IV*	80286	6/8	MS-DOS, Xenix	10.5M	1.2M-82.4M bytes	8	5	Color, monochrome: 1,120 by 750	$2,995
Panasonic Industrial Co. Two Panasonic Way Secaucus, N.J. 07094 *Business Partner (FX-600)*	8086-2	4.77/ 7.14	MS-DOS	256K-640K	Two 360K-byte floppies²	6	1	Color, monochrome	$1,295-1,495
Business Partner 286 (FX-800)	80286	6/8	MS-DOS	512K-1M	Single or dual floppy disk drives	10	1	Color, monochrome	$2,795-$2,995
Senior Partner series	8088	4.77	MS-DOS	256K-512K	Single or dual floppy disk drives	2	2	Monochrome	$1,495-$2,795
Exec Partner (FT-70, FT-80)	8086-2	4.77/ 7.16	MS-DOS	256K-640K	Two 360K-byte floppies/360K-byte floppy, 10M-byte hard disk	1	2	Gas plasma display	$2,595-$3,795
Prime Computer, Inc. Prime Park Natick, Mass. 01760 *Prime PC Option*	NA	4.77	MS-DOS	256K-640K	Single or dual floppy disk drives (20M-byte hard-disk option)	5	2	Color, monochrome: 720 by 300	$3,595³

AT performance at an XT price. Introducing the TeleCAT-286. $2995. Complete.

With TeleVideo, you always settle for more.

For some time, you've known exactly what kind of PC you could get with a mid-range budget.

But now, you can settle for a whole lot more. With the new TeleCAT-286™ from TeleVideo.

It starts you off with IBM AT compatibility. 512K RAM. A 20MB hard disk. A 1.2MB floppy. And everything else you need. Like an Intel 80286 CPU that runs at either 6 or 8 MHz. Even a high-resolution 640 x 400 pixel monitor for text and graphics.

To make even better use of internal space, we socketed the TeleCAT-286 for one MB of RAM, and also included serial and parallel ports on the motherboard. As a result, we can still give you three extra expansion slots.

And we didn't stop there. We've also designed more ergonomic features into the TeleCAT-286. Including sculptured keycaps on a high-quality keyboard. LEDs right on top of the three critical locking keys, so they won't get covered up by overlays. And a footprint that's 28% smaller than the IBM AT's. So you get more of your desk back, too.

There's a lot more we could say about the TeleCAT-286. But it's an even better idea to get your hands on it. So call 1 (800) TELECAT, Dept. 94, and we'll tell you where you can try one.

The TeleCAT-286. Our 20MB version is $2995; 30MB, $3495. For high performance at a low price, don't settle for less.

TeleVideo®
Settle for more.

TeleVideo Systems, Inc., 1170 Morse Avenue, Sunnyvale, CA 94088-3568 · (408) 745-7760

©1986 TeleVideo Systems, Inc. IBM is a registered trademark of International Business Machines, Inc. Screen graphics by Chartmaster ©Decision Resources, Inc.

Hardware Roundup/Microcomputers

Company/ Product	CPU	Clock Speed (MHz)	Operating System	Random-Access Memory (Range In Bytes)	Disk Storage	Number of Expansion Slots	Number of I/O Ports	Monitor Support/ Resolution In Pixels	Price
Sharp Electronics Corp. Systems Division Sharp Plaza Mahwah, N.J. 07430 *PC-7000 Compact Personal Computer*	8086	7.37	MS-DOS	320K-704K	360K-10M bytes	5	2	LCD display	$1,795
PC-7500 series	80286	6/8	MS-DOS	512K-1.2M	1.2M-40M bytes	8	2	Color, monochrome	$2,995-$4,990
Sperry Corp. P.O. Box 500 Blue Bell, Pa. 19424 *Sperry PC/HT*	8088-2	4.77/ 7.16	MS-DOS	256K	360K-byte, 20M-byte hard disk	5	2	Color, monochrome: 720 by 350	$2,995
Sperry PC/IT	80286	6/7.16/8	MS-DOS	512K-5M	1.2M-byte floppy, 40M-byte hard disk	8	3	Color, monochrome: 720 by 350	$4,695
Tandy Corp. 1800 One Tandy Center Fort Worth, Texas 76102 *Tandy 1000 SX*	8088	7.16/ 4.77	MS-DOS	384K-640K	Two 640K-byte floppies (20M-byte hard-disk option)	5	1	Color, monochrome: 640 by 400	$1,199
Tandy 3000 HL	80286	8	MS-DOS, Xenix	512K-4M	Built-in 5¼-in. floppy reads 360K-byte format[4]	7	1	Color, monochrome: 640 by 400	$1,699
Tandy 3000	80286	8	MS-DOS, Xenix System V	512K	Built-in 5¼-in. floppy	10	2	Color, monochrome: 640 by 400	$2,199-$4,299
Tandy 6000 HD	68000, Z-80A	8	TRS DOS, Xenix	512K-1M	One floppy, 15M-byte hard disk	6	3	Monochrome: 80 lines by 24 lines	$3,499
Televideo Systems, Inc. 1170 Morse Ave. Sunnyvale, Calif. 94088 *Tele-286 Models 1, 2*	80286	6/8	MS-DOS	512K-640K	Up to 1.2M-byte floppy, 40M-byte hard disk	8	2	Monochrome: 640 by 400	$2,695-$3,995
Telecat-286 Models I, II	80286	6/8	MS-DOS	512K-1M	360K bytes, 30M-byte hard disk	5	2	Monochrome: 640 by 400	$2,995-$3,495
Texas Instruments, Inc. P.O. Box 809063 Dallas, Texas 79380 *Texas Instruments Professional Computer*	8088	NA	MS-DOS	128K-768K	360K bytes	NA	NA	Color, monochrome: 720 by 300	$2,395
Texas Instruments Business Pro	80286	6	MS-DOS	512K-3M	1.2M bytes	14	1	Color, monochrome: 720 by 300	$9,185
Wang Laboratories, Inc. One Industrial Ave. Lowell, Mass. 01851 *Wang Professional Computer*	8086	8	MS-DOS, PC-DOS, CP/M, UCSD p-system	256K-768K	360K/1.2M-byte floppy disk (10M- 67M-byte hard-disk option)	Up to 8	2	Color, monochrome: 800 by 300	$1,940
Wang Advanced Professional Computer	80286	8	MS-DOS, PC-DOS, Xenix, CP/M, UCSD p-system	512K-2M	360K/1.2M-byte floppy disk, (20M-67M byte hard-disk option)	8	2	Color, monochrome: 800 by 300	$3,700
Zenith Data Systems Corp. 1000 Milwaukee Ave. Glenview, Ill. 60025 *Z-148, Z-158*	8088	5/8	PC-DOS, MS-DOS	256K-640K	Up to 360K bytes, 40M-byte hard disk	1-6	2	Color, monochrome: 720 by 350	$1,299-$1,999
Z-171, Z-181 portables	80C88	4.77	MS-DOS	256K-640K	360K-720K bytes	NA	2-3	LCD display	$2,399
Z-241	80826	6	MS-DOS, Xenix	640K-2M	1.2M-byte floppy, 40M-byte hard disk	10	2	Color, monochrome: 720 by 350	$3,499

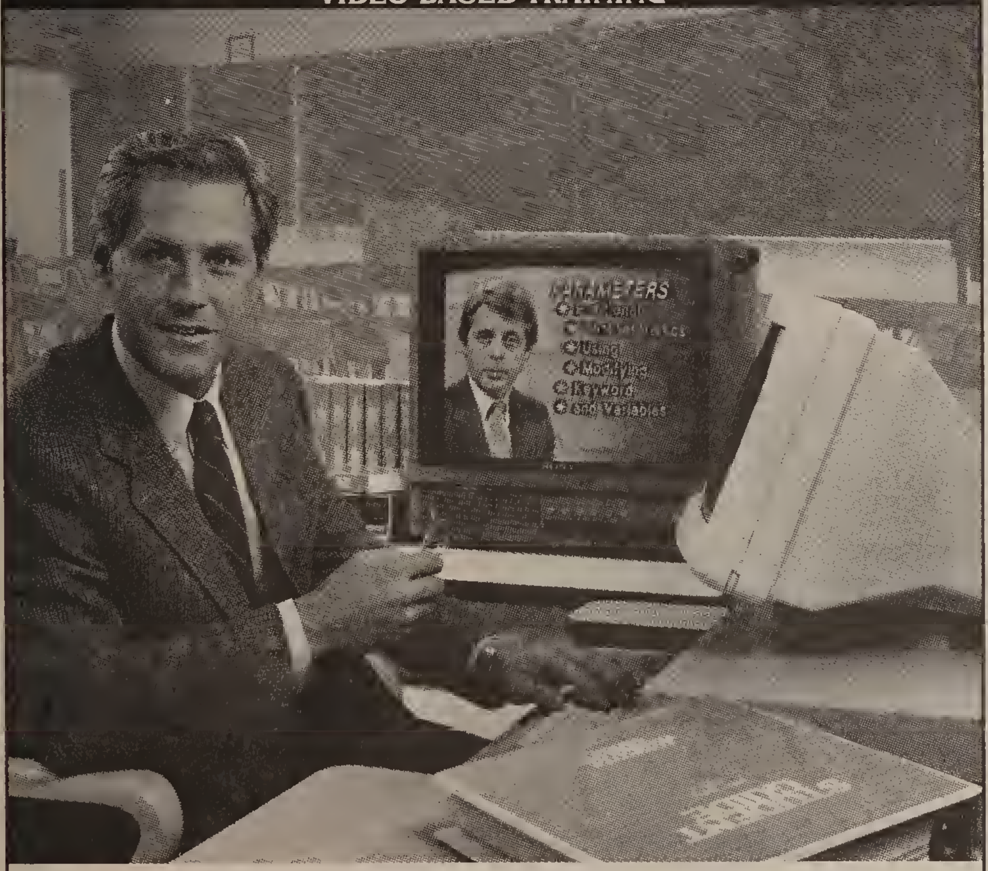
TECHNICAL/ENGINEERING WORKSTATIONS

Company/ Product	CPU (Microprocessor)	Clock Rate (MHz)	Performance (MIPS)	Main Memory Range (Bytes)	Minimum Configuration (Bytes)	Maximum Configuration (Bytes)	Operating System	Networking Support	Graphics Support	Price
Adage, Inc. 1 Fortune Drive Billerica, Mass. 01821 *6500*	Proprietary	40	1	1M-16M	105M	380M	Proprietary	Ethernet	Tektronix, Inc. 4014; MacNeal Swendler Corp. Anvil; Gecae International Ideas	$38,000-$60,000
Apollo Computer, Inc. 330 Billerica Road Chelmsford, Mass. 01824 *Domain Series 3000 — color*	Motorola, Inc. 68020	16	1.4	2M-8M	2M	8M	Domain/IX (Unix), Aegis	Domain, Ethernet, TCP/IP[1], CCITT X.25	Phigs, Sigraph Core, Digital Research, Inc. Graphics Kernal System (GKS), 4014 emulation	$9,900-$14,900
Apollo Domain DN570, DN580	68020	16	NA	2M-16M	2M	16M	Domain/IX, Aegis	Domain, Ethemet, TCP/IP, X.25	Phigs, Core, GKS, 4014 emulation	$29,900-$43,900
DN570 Turbo, DN580 Turbo	68020	20	3.4	8M-16M	8M	16M	Domain/IX, Aegis	Domain, Ethernet, TCP/IP, X.25	Phigs, Core, GKS, 4014 emulation	$43,900-$57,900
AT&T 1 Speedwell Ave. Morristown, N.J. 07960 *AT&T Unix PC Model 7300*	Motorola 68010	10	NA	.5M	512K	2M	Unix System V (plus Microsoft Corp. MS-DOS with the AT&T DOS-73 board)	Starlan/Unix (multiuser)	Graphic Support Software (GSS) drivers built in	$5,590
AT&T Unix PC Model 3B1	68010	10	NA	Up to 2M	512K	2M	Unix System V (plus MS-DOS with the AT&T DOS-73 board	Starlan/Unix (multiuser)	GSS drivers built in	$8,495-$9,995

* CW estimates based on vendor-supplied information.

[1] Transmission Control Protocol/Intemet Protocol

UNIX®/XENIX™ & 'C'
VIDEO-BASED TRAINING



Brings the Classroom to the Office

- No travel time or expense
- Self-paced
- Hands-on exercises
- Always ready for review or new staff

Developed by experts in designing and implementing UNIX/XENIX systems, as well as in teaching UNIX/XENIX & 'C'.

Courses include:*
UNIX Executive Perspective
UNIX Overview
UNIX Fundamentals for Programmers
vi Editor
UNIX Shell
'C' Language Programming

See for yourself how Video-Based Training can benefit your organization. (Also ask about our PC applications video-based courses.)

For Your Free Demonstration Package, or 48-page courseware catalog, call:
(800) 323-8649 or
(312) 987-4084

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
310 S. Michigan Ave.
Chicago, IL 60604
In Europe:
Bush House, 72 Prince St.
Bristol BS1 4HU

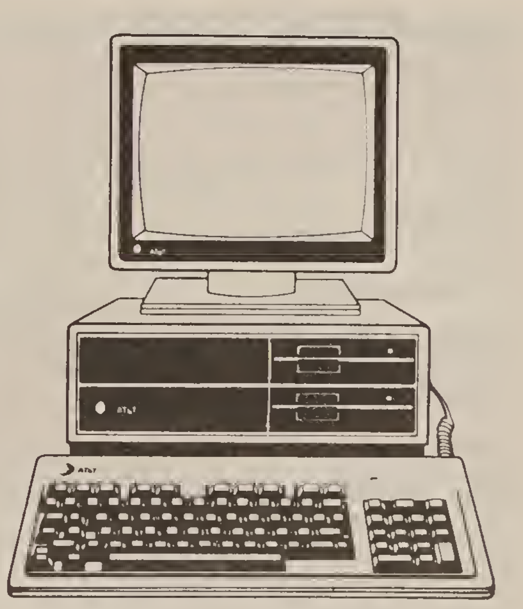
UNIX® is a registered trademark of AT&T.
™XENIX is a trademark of Microsoft.

*Public and on-site seminars also available on these and additional UNIX & 'C' subjects.

THE FUTURE IS BUILT IN...

WITH AT&T PC'S AND ELECTROREP

AT&T



If you expect your computing needs to grow over time, get to know a family of computers that can give you a clear growth pattern to the future. The AT&T family of PC's. The computers with the future built in.

All the comprehensive communications and networking expertise of one of the world's most reliable communications companies - AT&T-coupled with the expert network evaluation, design and the reliable service ElectroRep is renowned for.

AT&T and ElectroRep...
The Winning Combination
For Computer Capabilities.

ELECTROREP
DATACOMM
PRODUCTS INC.

366 No. Broadway
Jericho, N.Y. 11753
516-983-0540

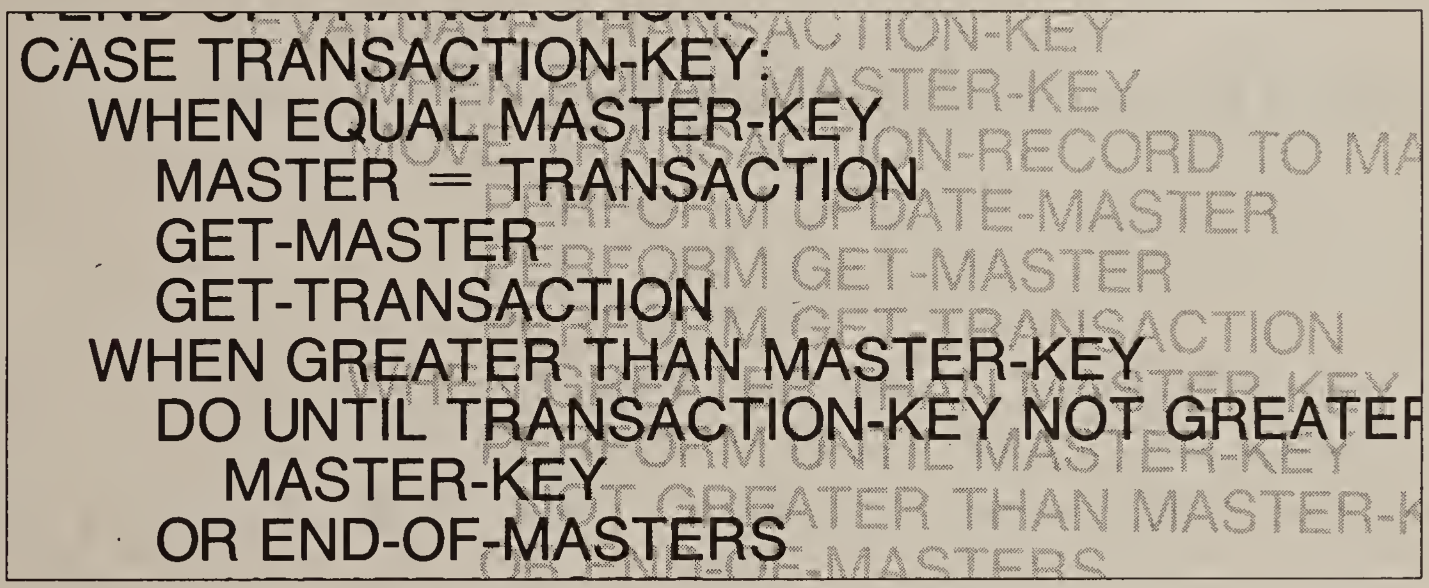
An Authorized Value Added Reseller of AT&T

Hardware Roundup/Microcomputers

Company/ Product	CPU (Microprocessor)	Clock Rate (MHz)	Performance (MIPS)	Main Memory Range (Bytes)	Minimum Configuration (Bytes)	Maximum Configuration (Bytes)	Operating System	Networking Support	Graphics Support	Price
Calcomp Co. 2411 W. La Palma Ave. Anaheim, Calif. 92801 *System 25 300 series, 600 series*	68010/ 68000	10	1*	1M-6M	1M	6M	Unix System V with Berkeley 4.3 extensions	Ethernet, SNA Gateway	Proprietary	$43,000-$84,000
Celerity Computing 9692 Via Excelencla San Diego, Calif. 92126 *C1200, C1230, C1260*	Proprietary	40	8-20	4M-24M	140M-337M	11G-44G	University of California at Berkeley Unix 4.2	Ethernet with TCP/IP, NFS, X.25, HASP, 2780, PC-Interface	Up to 8 color graphics stations with 2D, 3D capabilities	$38,000-$94,000
Convergent Technologies, Inc. 2314 N. First St. San Jose, Calif. 95131 *Mightystation I (graphics workstation)*	68020	12.5	1.9	1M-16M	1M	16M	CTIX (Unix System V.3)	RFS, TCP/IP	CGI, GKS, Phigs	$27,000
Mightystation II (graphics workstation)	68020	25	4	2M-64M	2M	64M	CTIX	RFS, TCP/IP	CGI, GKS, Phigs	$52,000
Data General Corp. 6300 S. Syracuse Way Englewood, Colo. 80111 *DS/7500*	Proprietary	25	1	4M-10M	4M	10M	AOS/DVS, AOS/VS, DG/4X	X.25, SNA, Xodiac, Ethernet	DG/GI, GKS, DG/GT	Monochrome $15,900, Color $25,800
Digital Equipment Corp. 146 Main St. Maynard, Mass. 01746 *Vaxstation II/RC*	Microvax II	20	1-2	3M-5M	3M	5M	VMS, Unix 4.2 (Ultrix)	ISO (Decnet), TCP/IP	GKS, Core, Tektronix 4014, X-Windows, VWS	$14,995
Vaxstation II/GPX	Microvax II	20	1-2	5M-16M	5M	16M	VMS, Unix 4.2	ISO (Decnet), TCP/IP	GKS, Core, Tektronix 4014, X-Windows, VWS	$24,995
Vaxstation II	Microvax II	20	1-2	2M-16M	2M	16M	VMS, Unix 4.2	ISO (Decnet), TCP/IP	GKS, Core, Tektronix 4014, X-Windows, VWS	$26,000
Hewlett-Packard Co. 3000 Hanover St. Palo Alto, Calif. 94304 *HP 9000 series*	68020	16.67	1.5	Up to 7.5M	4M	7.5M	HP-UX MS-DOS (option)	IEEE 802.3, Ethernet	VD-CGI, GKS, HP Display List (based on Phigs), HP Windows	$15,600-$54,800
IBM 900 King St. Rye Brook, N.Y. 10573 *RT Personal Computer*	Proprietary	NA	1.6-2.1	1M-8M	1M	8M	AIX	Ethernet, TCP/IP, PC Network, Token-Ring network	IBM 5080 (GSL)	$7,900-$15,620
Masscomp Co. 1 Technology Park Westford, Mass. 01886 *MC5000 series*	68020	12.5-16.7	1.6-2.5	2M-16M	2M	16M	RTU Unix	Ethernet, TCP/IP, X.25	Core, GKS, proprietary	$14,000-$32,000
Silicon Graphics, Inc. 2011 Stierlin Road Mountain View, Calif. 94043 *Iris 2400, 2500*	68010	10	1	2M-8M	2M	8M	Unix	Ethernet with XNS or TCP/IP, IBM 3270	Iris Graphics Library, GKS	$24,900-$59,900
Iris 3020, 3030	68020	16.67	1.8	4M-16M	4M	16M	Unix	Ethernet with XNS or TCP/IP, IBM 3270	Iris Graphics Library, GKS	$42,900-$54,900
Sun Microsystems, Inc. 2550 Garcia Ave. Mountain View, Calif. 94043 *Low End 3 Flash 50*	68020	15	1.5	4M	71M	142M	Unix 4.2	Ethernet	GKS	$7,900-$13,900
3-160C	68020	16.67	2	4M-16M	71M	1.3G	Unix 4.2	Ethernet	GKS	$34,900-$50,000
Tektronix, Inc. P.O. Box 1700 Beaverton, Ore. 97075 *6130 Intelligent Graphics Workstation*	National Semiconductor Corp. 32016	10	.6	1M-8M	20M	80M	Unix (proprietary version)	Ethernet	Tektronix 4100, 4120	$9,950-$20,000

Cobol 85: Living in the shadow of 4GLs

Where are all the mainframe compilers? • How to draw more life from a familiar tool • Cobol 85's productivity enhancers: Evaluate and Perform



```
CASE TRANSACTION-KEY:
   WHEN EQUAL MASTER-KEY
      MASTER = TRANSACTION
      GET-MASTER
      GET-TRANSACTION
   WHEN GREATER THAN MASTER-KEY
      DO UNTIL TRANSACTION-KEY NOT GREATE
         MASTER-KEY
      OR END-OF-MASTERS
```

By **LEMUEL SKIDMORE**

Two contrary trends are coming to light in the DP world. On one hand, corporate installations make major investments in so-called productivity tools, such as fourth-generation languages and application generators, that may or may not serve their needs. On the other hand, Cobol 85, a recent ANSI Cobol standard that was quite controversial during its development, goes unnoticed in the mainframe world.

These two trends run contrary because the productivity enhancements that are the object of the first are provided by Cobol 85, the object of the second. Several writers make vague reference to the Cobol 85 productivity features, but none, to my knowledge, explains how these features rate such a label.

In order to explain this, we should first examine the concept of productivity. Programmer productivity should be measured in terms of the functioning applications delivered. This delivery is the end result of a lengthy process that includes analysis, design, implementation, training and, of course, programming. The programming part is at most 40% of the total effort.

If that figure seems unlikely, consider the truism that states that any programmer's time estimate should be multiplied by 2.5 to be realistic. The reason is that programmers consider only their 40% of the production process.

Productivity improvement in this area alone, therefore, yields little improvement in terms of the entire product. For example, a 100% gain in programmer productivity yields only a 20% gain in terms of the whole.

This may be either discouraging or enlightening, but the fact remains that analysis and design do not disappear when a fourth-generation language is introduced. What does happen is that the 40% of the process that is programming may be reduced, thus allowing more concentration on analysis and design and keeping the programming/reprogramming cycle from expanding beyond 40%.

Choice of tools

Since one objective of application developers is to improve productivity — that is, to deliver more functioning applications — the next step is the choice of a tool to improve productivity in the programming portion of development. Unfortunately, the first response has been to throw away the existing tool, Cobol, and replace it with some unknown, nonstandard, different-from-shop-to-shop fourth-generation language.

I am not criticizing fourth-generation tools. They have their place and will grow in importance. I am merely questioning the rejection of Cobol, a standard tool that is portable across the whole range of computers, known to most business application programmers and already owned by DP shops.

The decision to reject Cobol is even more questionable, given that its potential has yet to be tapped. In other words, why discard Cobol before learning to use it effectively?

The contention here is that, in terms of productivity in the programming portion of the development cycle, Cobol can be a useful tool. Furthermore, Cobol 85 can be a more useful tool than existing Cobol versions.

This being true, one would think that installations would jump at the chance to implement Cobol 85. But they are not for various reasons. First of all, only one compiler, that from Tandem Computers, Inc., is certified for high-level compliance to the ANSI 85 Cobol standard. High-level compliance means that the full range of Cobol 85 features are included. Micro Focus, Inc., Ryan-McFarland Corp. and others offer microcomputer Cobol compilers that have been certified at the intermediate level and

About the author

Skidmore is founder of Skidmore Resource Management Co. of Clinton, Conn., a consulting and training firm serving the IBM mainframe world. He is also vice-chairman of ANSI Cobol Committee X3J4.

> ***System programmers choose compilers for a variety of reasons, none of which has to do with the productivity of application programmers. These programmers are to be forgiven for that, because such productivity is not their concern.***

include some but not all of these features.

Where are all the mainframe compilers? Their development has been delayed for a variety of reasons, all of which could be overcome by demand in the user community. There has been no outcry from users, because on the whole, few are aware of the new standard. The awareness that does exist is a pessimistic one. This is due in part to the misdirected controversy over Cobol 85, turmoil that arose after the new language introduced features that made it incompatible with previous Cobol versions. Meanwhile, MIS departments chase the fourth-generation-language rainbow, contradicting their mission of quality applications in less time.

Finally, the decision to procure a new compiler is almost always made by the wrong people. The wrong people include anyone outside the realm of application development. Yes, system programmers need to be involved — a little — in the decision process, but they should not drive it.

The right decision makers

A Cobol compiler is a tool for application development. To allow anyone other than application developers to choose the tool is analogous to application developers choosing tools for users. The difference is that some application developers have learned humility over the years when insisting that they know what is best for their users.

System programmers choose compilers for a variety of reasons, none of which has to do with the productivity of application programmers. These programmers are to be forgiven for that, because such productivity is not their concern. Instead, their concerns include such technical issues as choosing to convert from Cobol 68 to Cobol 74 because of the latter's additional file management capabilities.

Very few application programmers were (or are) even aware of the differences between these two earlier ANSI standards. If the choice to upgrade had been made in an appropriate area, it would have given the applications side of the house the opportunity to evaluate the significant improvements in Cobol 74. Instead, the bad habits of 20 years ago live on in programs being developed today.

To use a more current example, IBM's latest MVS Cobol compiler, VS Cobol II, contains many of the productivity enhancements of Cobol 85. Although IBM does not, as of this writing, offer a certified Cobol 85 compiler, MVS users could be taking advantage of these facilities now.

In the majority of shops I am aware of, the acquisition of VS Cobol II is treated as a technical issue because it is the only compiler that supports the 31-bit addressing scheme of MVS/XA. The decision to implement VS Cobol II, which was announced in 1984, is therefore held hostage by system programmers with the justification that the compiler is unnecessary, at least until the conversion to MVS/XA and then only when Cobol applications need to address areas beyond the 16M-byte line.

All of these issues work together to keep Cobol 85 out of a very important marketplace — the mainframe world. That is a problem because of the significant improvements in the new standard. How do these improvements increase productivity? By compressing the development cycle and thereby shortening the programming part of the cycle.

To explain how this

Gould: One-stop UNIX® shopping.

Everything you need, from the company that ties it all together. Gould offers the most complete range of UNIX-based systems in the world:

- Secure (C2) UNIX systems
- AT&T System V and BSD 4.x
- Integrated information systems
- Desktop-to-mainframe hardware

For more information on Gould's one-stop shopping, contact
Gould Inc., Information Systems
Computer Systems Division,
6901 West Sunrise Boulevard,
Fort Lauderdale, Florida 33313
1-800-327-9716.

High Performance Solutions in Factory Automation, Computers, Instrumentation, Defense, and Semiconductors.

GOULD
Electronics

Secure (C2) UNIX® systems
Diskless Workstation Support
Network File System (NFS®)
AT&T System V and BSD 4.x
Integrated information systems
Desktop-to-mainframe hardware
Languages
C, FORTRAN, Ada, Pascal, ACECOBOL™,
Common Lisp...
Database Management Systems
INGRES™, UNIFY,® EMPRESS/32™, INFORMIX®...
Communications
Ethernet™, (TCP/IP and XNS™)
IBM 2780/3780, 3270, BSC and SNA
Public Data Networks (X.25)
Defense Data Network (DDN)

Tradem[illegible]ks ACECOBOL — Austec, Inc., INGRES — Relational Technology, Inc., EM[illegible] FSS/32 — Rhodnius, Inc., [illegible] and XNS — Xerox Corporation.

[illegible]ed Trademarks UNIX — AT&T [illegible]es NFS — Sun Microsystems, Inc., [illegible]FY — Unity Corporation, INFORMIX — [illegible]or[illegible] Database Systems, Inc

DATA GENERAL ASKS: WHAT WILL YOUR OFFICE SYSTEMS COST YOU DOWN THE ROAD?

OUR CEO® BUSINESS AUTOMATION SOLUTIONS GIVE YOU THE LOWEST COST OF OWNERSHIP.

Bypass the high cost of other companies' office automation systems. With Data General's line of fully compatible computers. The industry leaders in productivity.

Our new MV/20000™ provides superior price/performance. Better than DEC's VAX™ or IBM®'s 4300 series. While our MV/2000DC™ sets the standards for departmental computing systems.

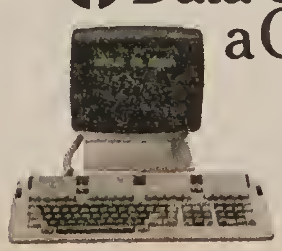
We take you beyond office automation. By integrating mainframes, PC's and applications into our industry-leading CEO Business Automation. And by cost effectively distributing your information resources.

We also protect your investment with our commitment to industry standards in communications and data management.

It all adds up to advanced Business Automation solutions. To give you the lowest cost of ownership.

All of which makes Data General the best route to take. For more information, call 1-800-DATAGEN (in Canada call 1-800-268-5454). Or write: Data General, 4400 Computer Drive, MS C-228, Westboro, MA 01580.

Data General
a Generation ahead.



© 1986, Data General Corporation, Westboro, MA. MV/20000, MV/2000DC are trademarks, and CEO is a registered trademark of Data General. IBM is a registered trademark of International Business Machines Corp. VAX is a trademark of Digital Equipment Corp.

Why the COMPAQ
continue to be the world's most
long after others

The 32-bit, 16-MHz Intel® 80386 microprocessor is at the heart of the all-new COMPAQ DESKPRO 386™. As such, it runs industry-standard business *and* engineering software 2-3 times faster than ever. But that's where the similarity with other 80386-based PCs ends. From there, we went on to incorporate performance features to optimize every component. COMPAQ® took full advantage of the increased speed and power of this powerful engine in order to achieve a true minicomputer level of performance in a personal computer.

The most advanced personal

Lotus® is a registered trademark of Lotus Corporation. Intel® is a registered trademark of Intel Corporation. Microsoft® is a registered trademark of Microsoft Corporation. COMPAQ® is a registered trademark and COMPAQ DESKPRO 386™ is a trademark of COMPAQ Computer Corporation.

DESKPRO 386 will
advanced personal computer
copy its engine

The most memorable personal computer

Combining advanced 32-bit architecture with the most advanced memory technology, the COMPAQ DESKPRO 386 can process twice as much information as 16-bit computers in the same amount of time. For additional performance from the programs you use, you can break the 640-Kbyte memory barrier and use up to 8 Megabytes of high-speed 32-bit RAM with the COMPAQ Expanded Memory Manager. This software comes standard and works with programs that follow the Lotus®/Intel/Microsoft® (LIM) Expanded Memory Specification, allowing you to build bigger spreadsheets, sort larger databases and run more programs, without having to buy additional software or use expansion slots, leaving more room for you.

Greater stores of knowledge

The COMPAQ DESKPRO 386 easily provides the most storage capacity and performance available in any personal computer. High-performance 40-, 70- and 130-Megabyte fixed disk drives access information 50 to 150 percent faster than those used in other advanced-technology PCs. Plus, they store from 5,000 to 50,000 more pages of data.

We also developed a fast, economical way to protect all that data. You can back up and verify 40 Megabytes of data on a single formatted cartridge at the timesaving rate of one Megabyte per minute—that's four times the capacity and twice the transfer rate of our previous system.

Storage drives access data faster, enhancing performance.

Specifications

Processor: *32-bit 80386; 16-MHz clock speed; 4- or 8-MHz 80287 coprocessor socket; real-time clock and battery.*

Memory: *One-Megabyte RAM at entry level, expandable to 14 Megabytes; 32-bit memory bus; COMPAQ Expanded Memory Manager.*

Storage Devices: *1.2-Megabyte diskette drive (one standard, second optional); 360-Kbyte diskette drive (optional); 40-Megabyte half-height fixed disk drive (average access less than 30 ms); 70-Megabyte full-height fixed disk drive (average access less than 35 ms); 130-Megabyte full-height fixed disk drive (average access less than 25 ms); internal fixed disk drive backup (40 Megabytes/tape).*

Standard Configurations

Model 40: *One-Megabyte random-access memory (RAM); one 1.2-Megabyte diskette drive; one 40-Megabyte fixed disk drive; three 8/16-bit expansion slots available; three 8-bit expansion slots available.*

Model 70: *One-Megabyte random-access memory (RAM); one 1.2-Megabyte diskette drive; one 70-Megabyte fixed disk drive; two 8/16-bit expansion slots available; three 8-bit expansion slots available.*

Model 130: *One-Megabyte random-access memory (RAM); one 1.2-Megabyte diskette drive; one 130-Megabyte fixed disk drive; two 8/16-bit expansion slots available; three 8-bit expansion slots available.*

Shifting speeds

Some copy-protected software programs have varying speed requirements. So the compatibility experts at COMPAQ engineered the COMPAQ DESKPRO 386 to accommodate them. The system will *"automatically"* raise and lower the operating speed when your software requires it—one more way that our attention to detail further insures complete compatibility.

Expanding horizons

Exceptional expandability lets you add as many as four internal storage devices. Place up to 10 Megabytes of high-speed 32-bit RAM on the system memory board without using an expansion slot; 14 Megabytes of RAM using only two. Or configure it using the COMPAQ Enhanced Color Graphics Board with built-in lightpen interface taking up a single slot. This leaves four expansion slots that are compatible with industry-standard expansion boards. So you can communicate with mainframes, in a network, or in a multi-user environment.

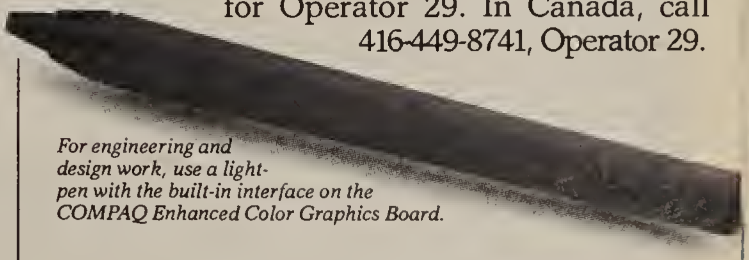
Built to higher standards, with "more" standards

We build more into the COMPAQ DESKPRO 386, with more care. We have included interfaces for printers and modems. We improved the keyboard to help touch typists avoid mistakes and simplify common chores. We offer a color monitor with enhanced color graphics. And we offer a one-year limited warranty. These are just a few of the reasons why the COMPAQ DESKPRO 386 is the unparalleled value for demanding users.

History in the making

COMPAQ reached the Fortune 500 faster than any other company in history by making computers that work better. And even though some companies may copy one or two of our latest computer's features, it will be years before they copy them all. Such concern for engineering detail is why COMPAQ Computers are recognized as best in their classes by industry experts and users alike.

For the Authorized Dealer nearest you, or to obtain a brochure, call 1-800-231-0900 and ask for Operator 29. In Canada, call 416-449-8741, Operator 29.



For engineering and design work, use a lightpen with the built-in interface on the COMPAQ Enhanced Color Graphics Board.

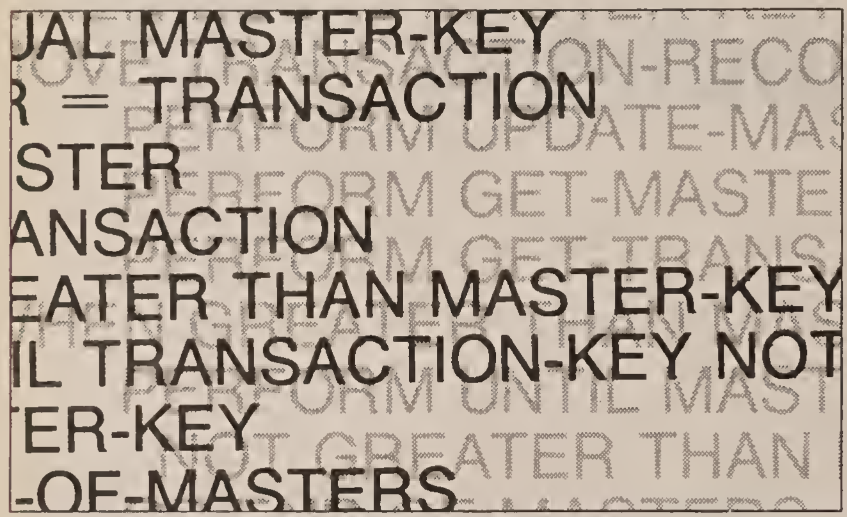
It simply works better.

The most advanced personal computer because it incorporates the most advances.

computer in the world

COMPAQ
DESKPRO 386™

©1986 COMPAQ Computer Corporation, all rights reserved



> ***The claim that a switch from current Cobol to Cobol 85 represents a leap of the same order of magnitude as that from assembler to Cobol invites potshots from all types of development people, from those who believe that assembler is the language of the future to those who think that Cobol is dead.***

compression is accomplished, let me explain a development philosophy. In the mid-1970s, I was writing macro-level IBM CICS applications in assembler. These applications were developed in a structured fashion, even though the term "structure" is very rarely used in the same sentence with CICS, let alone macro-level CICS, let alone macro-level CICS written in assembler.

'Think Cobol'

The structure of the application development was enforced by my mentor, who said, "Think Cobol, write assembler." My mentor meant by this that one should think in higher level terms — design terms — and implement the higher level construct in the source language. Keeping that concept in mind, I later taught structured Cobol to students by urging them to think pseudocode, write Cobol, pseudocode being the design code one would use to specify write a program that would later be written in another language such as assembler or Cobol. Again, the idea is, think at the design level, work at the coding level.

The move from assembler to Cobol represents a productivity enhancement because it is compressed; that is, one step was removed from the development process. Using the structured programming features of Cobol 85, it is possible to code constructs that look like pseudocode. Please note that many Cobol programmers, on the contrary, think assembler and write Cobol — thus the preponderance of nonmaintainable Cobol programs.

Now, the process is compressed further. The programmer can think in terms of a higher level tool (such as a structure chart) and write pseudocode. The difference is that the pseudocode in this case is standard Cobol.

The claim that a switch from current Cobol to Cobol 85 represents a leap of the same order of magnitude as that from assembler to Cobol invites potshots from all types of development people, from those who believe that assembler is the language of the future to those who think that Cobol is dead. Both extremes, however, are equally wrong. What makes anyone think that new tools alone will solve the productivity crisis? We have not even learned to use and to keep up with the tools we have, let alone been able to adjust to a multiplicity of nonstandard tools.

Enabling compression

Cobol 85 is full of features that enable the sort of compression discussed above. Three features will be discussed here, not to teach Cobol 85 or to recommend a specific structured

What can you count on for timely systems solutions?

CMI COMMITMENT

At CMI, we work hard to provide you with long-term solutions for your data processing and telecommunications needs. Our creative professionals are committed to spending the time and energy necessary to make your job easier.

Depend on us, too, for technical support, from selection and planning through reconfiguration, delivery and installation. We offer creative lease arrangements for all your capital equipment needs. CMI can even handle the trade-in or resale of your equipment.

CMI has long been a leading supplier of new and used IBM and AT&T equipment. Our range of services has now been extended to include all brands of data processing and telecommunications equipment. That's why many Fortune 500 companies turn to CMI for their changing technology needs. CMI gives you greater flexibility for today as well as tomorrow. CMI is the Intelligent Alternative.

CMI
A Torchmark Company

CMI Corporation
2600 Telegraph Rd., P.O. Box 2026, Bloomfield Hills, MI 48303-2026
(313) 456-0000/TWX: 810-232-1667

BX* N-140⅛ + ¾ B 140.N140¼N 120x
,238,800 AT 2:59 AXM N-55½-¾ B 5
55¾N 3x10 V 436,000 AT 2:57 XIC M + 9
9¾N.10N 20x99 V 18,500 AT 2:35 I
-5.89 AV + 16¼ DOC --48⅜-⅞ YTT --31⅝
ROC + 28½-⅜ VOLU 24,150 YA + 47⅞-½*
+ 19¾-⅝ WWA -28⅜-⅜ RTY --44¾ + ⅝ TICK
AP --42¾-⅝ QUOT + 34¼ + 1 T + 61½-⅛*
-41⅛ + ⅛ PATIENT NAME: JOHN SM
BLOOD COUNT: HEMA TO CRIT: 4
HEMOGLOBIN: 16.6 MCV:90 PATI
NAME: FRANK WHITE, BED#,
PHYSICIAN: DM MORALES OPERAT
DATE: 9/22 PATIENT NAME: JOE SM
APPT. DATE: 9/24, APPT. TIME: 0
REASON: ..... ZQL - 337.75 -4.00 B 338.
358.04 0 338.00 H 338.00 L 337.75 V 2
SP + 4770 -50 04810.4800 H4895 L472
:05 GOZ.Z#1 + 3545 + 61 CH 6665 CL
TL 2500 OI 50262 AT 2:42 FO.F - 100 - 1
100 S 25 X 200 0 100 H 100 L 100 V 10 AT
QUOT.Q 18¼-¼ B 18¼. 18¼ 1X1 0 18½ H 18¼
476,700 AT 3:15 IBX* N-140⅛ +
140.N140¼N 120x50 V 2,238,800 AT
AXM N-55½-¾ B 55½N. 55¾N 3x10 V 436
AT 2:57 XIC M + 9⅞ + ¼ B 9¾N.10N 20x
18,500 AT 2:35 INDU --5.89 AV + 16¼
-48⅜-⅞ YTT --31⅝ + ⅛* ROC + 28½-⅜ V
24,150 YA + 47⅞-½* MOR + 19¾-⅝ WWA -2
RTY --44¾ + ⅝ TICK --296 AP --42¾-⅝ Q
+ 34¼ + 1 T + 61½-⅛* DIS --41⅛ + ⅛ PATI
NAME: JOHN SMITH BLOOD COUNT: H
TO CRIT: 47.0, HEMOGLOBIN: 16.6 MC
PATIENT NAME: FRANK WHITE, BED#

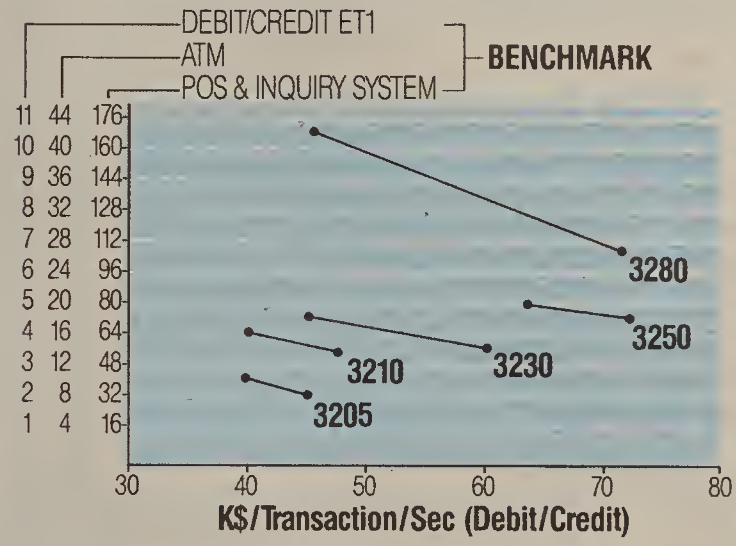
In on-line transaction processing, cost per transaction is...

THE BOTTOM LINE

Concurrent Computer Corporation offers you the performance, full functionality, reliability and growth path you need for your on-line transaction processing system. All at a price you just can't beat. And we can prove it.

The Proof-Whether you measure cost/performance by the Debit-Credit benchmark (ET1), the TP1 benchmark, or your own, we've got the numbers.

Transactions Per $



Systems start at $15K per transaction. And can grow to more than 100 transactions per second depending upon your application.

The Rest-Our computer family is fully compatible so your system can grow as your application does, without rewriting your software.

We offer a high degree of IBM (SNA) and ISO connectivity as well as a full set of communications networking facilities.

You don't have to sacrifice functionality to get cost/performance either. We offer a powerful, easy to use relational database manager and transaction controller, as well as fourth generation languages and a comprehensive office automation package.

If total system cost is as important to you as performance, we can help put numbers on your bottom line.

Call **1-800-631-2154** or write to:

Concurrent Computer Corporation
2 Crescent Place
Oceanport, NJ 07757

Give me the proof.

Name____________________
Title____________________
Company____________________
Address____________________
City__________ **State**_____ **Zip**_____
Phone (   )____________________
Application____________________

Mail to: Concurrent Computer Corporation,
Two Crescent Place, Oceanport, N.J. 07757

Concurrent
Computer Corporation

technique, but to illustrate my point. They are the EVALUATE verb, the in-line PERFORM and the explicit scope terminator.

These features are not new. Many compilers have contained them for years. In the IBM world, they are available in DPPX Cobol for the 8100 series, in VS Cobol II for mainframes under MVS and in various compilers for the IBM Personal Computer and compatibles.

My earlier point, that Cobol 85 constructs are close to pseudocode, depends, of course, on the pseudocode one uses, but let me illustrate from my own experience.

The chart shows two examples of a specification for a two-file match. One is pseudocode intended to be translated to a version of Cobol that lacks the three aforementioned features. The other is standard Cobol — Cobol 85. It does not matter what detail-design tool one uses — pseudocode, flow chart, Chapin chart and so on. Any tool at the detail level can be discarded if the source language is Cobol 85. The point is that the two are very close.

In the first case — pseudocode — translating to old Cobol code would require such glaring deviations as an IF-ELSE construct to replace the CASE statement and the invocation of separate procedures replacing the DO-LOOPS.

Old Cobol vs. Cobol 85

Pseudocode
(Old Cobol)

```
TWO-FILE-MATCH:
  GET-MASTER
  GET-TRANSACTION
  DO UNTIL END-OF-MASTERS
    OR END-OF-TRANSACTIONS:
      CASE TRANSACTION-KEY:
        WHEN EQUAL MASTER-KEY
          MASTER = TRANSACTION
          UPDATE-MASTER
          GET-MASTER
          GET-TRANSACTION
        WHEN GREATER THAN MASTER-KEY
          DO UNTIL TRANSACTION-KEY NOT GREATER THAN
              MASTER-KEY
          OR END-OF-MASTERS
            UPDATE-MASTER
            GET-MASTER
          END-DO
        WHEN LESS THAN MASTER-KEY
          REPORT-ERROR
          GET-TRANSACTION
      END-CASE
  END-DO

GET-MASTER:
  READ MASTER-FILE
  IF END-OF-FILE
      END-OF-MASTERS IS TRUE
  END-IF

GET-TRANSACTION:
  READ TRANSACTION-FILE
  IF END-OF-FILE
      END-OF-TRANSACTIONS IS TRUE
  END-IF

END-TWO-FILE-MATCH
```

Cobol 85

```
TWO-FILE-MATCH.

  PERFORM GET-MASTER
  PERFORM GET-TRANSACTION
  PERFORM UNTIL END-OF-MASTERS
    OR END-OF-TRANSACTIONS
      EVALUATE TRANSACTION-KEY
        WHEN EQUAL MASTER-KEY
          MOVE TRANSACTION RECORD TO MASTER-RECORD
          PERFORM UPDATE-MASTER
          PERFORM GET-MASTER
          PERFORM GET-TRANSACTION
        WHEN GREATER THAN MASTER-KEY
          PERFORM UNTIL TRANSACTION-KEY
                NOT GREATER THAN MASTER-KEY
              OR END-OF-MASTERS
            PERFORM UPDATE-MASTER
            PERFORM GET-MASTER
          END-PERFORM
        WHEN LESS THAN MASTER-KEY
          PERFORM REPORT-ERROR
          PERFORM GET-TRANSACTION
      END-EVALUATE
  END-PERFORM

  IF END-OF-MASTERS
    PERFORM UNTIL END-OF-TRANSACTIONS
        PERFORM REPORT-ERROR
        PERFORM GET-TRANSACTION
      END-PERFORM
  END-IF

  IF END-OF-TRANSACTIONS
      PERFORM UNTIL END-OF-MASTERS
        PERFORM UPDATE-MASTER
        PERFORM GET-MASTER
    END-PERFORM
  END-IF

  STOP RUN.

GET-MASTER.

  READ MASTER-FILE
    AT END SET END-OF-MASTERS TO TRUE.

GET-TRANSACTION.

  READ TRANSACTION-FILE
    AT END SET END-OF-TRANSACTIONS TO
      TRUE.
```

Translating from pseudocode to old Cobol source code requires an extra step in the programming process. This translation creates an additional place in which errors might occur. Cobol 85 allows a compression of the programming process, reducing or eliminating that extra step.

Two issues are important here. First, the translation of pseudocode to Cobol may seem trivial, but it is not. In fact, most programming errors are caused by attempts to code around design flaws rather than to correct designs. The inclusion of the additional pseudocode to Cobol conversion, while necessary, results in one more place in which error can be introduced.

The second issue is that the Cobol 85 code is followed more easily, is more readable, does not have to be converted and keeps control flow before the eyes of the programmers and the maintenance person.

In the second case — Cobol 85 — the new language elements, which accomplish the compression of Cobol to pseudocode, are the in-line PERFORM and the EVALUATE statement. The in-line PERFORM eliminates the need to reference a paragraph name. Besides immeasurably increasing readability, this feature ends the need to hold several places in a source listing at once.

The EVALUATE statement directly maps the CASE statement. This eliminates the need for complex IF-ELSE structures. A simple selection mechanism causes more migraines than any other feature of old Cobol.

The issue of scope termination is addressed only obliquely in this example. Notice the relative lack of periods, the old way of ending the scope of a statement. The END-IF terminator is useful in many additional ways, and its use, along with the power of EVALUATE, will end both paranoia about nested IFs and the use of overly complex IF-nests.

The main advantage here is that an entire step is either reduced to triviality or eliminated by the implementation of Cobol 85. No matter how infatuated one is with fourth-generation languages, the proven ability of Cobol to deal with complex applications, coupled with the proven tendency of fourth-generation languages to increase in complexity at a greater rate than the complexity of the applications, should indicate that Cobol in general, and Cobol 85 in particular, deserve a closer look.

This scrutiny should be made with the eye of an application developer and from a productivity standpoint. Only then can an installation be sure of implementing a common, standard, proven tool.

This article is not intended to present an exhaustive demonstration of the features of Cobol 85. Rather, the features of Cobol 85 are presented within the framework of productivity. Bad designs will hamper Cobol 85 as they do old Cobol and fourth-generation languages.

With Cobol 85, DP shops can use a familiar tool in new ways, reduce the amount of time spent programming and produce code that is closer to the design than was previously the case. Thus, like fourth-generation languages, this tool allows the developer to spend more time on design. ■

C P F
The CICS Print Facility

CPF is the complete CICS based report distribution system.

Features include:

- Spools reports from CICS applications
- Message sending
- Allows secured user access to reports
- Automatic Aging
- PF key driven, with help screens
- Spools reports from JES or POWER
- Forms controls
- Displays reports on-line
- Screen copy for any CICS screen
- And More!

CPF allows sites to choose how they want reports distributed. Print batch reports on-line or print on-line reports in batch Complete control of report distribution is accomplished at every level in your organization. Site specific install options allow sites to utilize the package for their own specific use. CPF is a full feature print spooling package that performs the work of up to ten other products.

CPF is available for OS and DOS sites and is compatible with all CICS environments.
Call today for a free trial or more information — (206) 842-1011

Software Technology, Inc.
12725-B Miller Road N.E.
Bainbridge Island 98110

We Sell Value. At the Right Price.

- **IBM PCs** from **$950**
- **IBM PC XTs** from **$1,395**
- **Diablo Printers** from **$525**
- **Okidata Printers** from **$395**
- **Couplers and Modems** from **$25**
- **DEC LA 100-series Printers** from **$500**
- **DEC Teleprinters** from **$125**
- **DEC VT-series CRTs** from **$285**

QWIKTERM
The Source for Quality Refurbished Equipment Since 1979

QWIKTERM 153 Andover Street, Danvers, MA 01923 (617) 246-1665

Boston • New York • Washington • Chicago • Houston • San Francisco • Los Angeles

Becoming a technical leader

Can you say ‘computer’ and ‘problem’ in the same sentence?

How to crystallize system requirements • Forging alternate solutions • Obstacles: self-blindness, ‘No-Problem’ Syndrome and one right answer

By GERALD WEINBERG

Enough of theory: What you are actually doing that either makes you creative or blocks your brain? Can a new model of leadership really work for you, or is it only as useful as the latest diet fad? The *theory* of dieting is simple enough: All you have to do is achieve a balance between input and output. According to the balance theory, I should not have this bulge around the middle, but look at me.

Theories are like that. I can give you all sorts of techniques for developing your problem solving or leadership abilities, yet find that you are making no progress. In this article, I would like to explore the most common obstacles to progress toward problem-solving leadership, starting with the question why I sometimes put on pounds without knowing why.

Keeping trim is important to my business because people pay more attention to what you do than what you say. As a consultant who is supposed to help streamline organizations, I make a poor model if I'm not exactly streamlined myself. At one such organization, my wife Dani and I were looking for the source of diminished productivity. After we spent the day observing and interviewing, Shirley, the manager of the organization's systems analysis sections, invited us home for dinner.

What did you eat for dessert?

Shirley and her husband, Harrison, lived with their three sons in a busy but attractive neighborhood, which seemed well matched to Shirley's temperament. When I raided Shirley's refrigerator for a predinner snack, I was surprised to find evidence that she was struggling to control her weight. There were low-cal foods inside, calorie charts on the door and a box of appetite suppressants on top. As she prepared supper, we discussed our common problem.

"I must have a metabolic problem," I said.

"Me, too. I used to have trouble with snacks, but I've controlled that, yet I still can't lose weight."

"Maybe it's eating out. You know, Dani and Harrison have already promised the kids we'll go out to Swenson's after dinner. I'd rather stay home because I can't resist their ice cream."

"Well, I can resist," Shirley boasted. "I'll just have a cup of coffee."

"Maybe if I eat a full supper," I said, "I won't have any appetite for dessert." But there wasn't much conviction in my voice.

I ate a full supper, but at Swenson's I wasn't able to resist ordering a dish of raspberry sherbet. Dani had a small marshmallow sundae, Harrison had a large banana split, the two oldest boys had special children's sundaes, and the youngest had a chocolate chip cone. Only Shirley resisted, righteously and vocally ordering a cup of coffee. I noticed, though, that Shirley took cream in her coffee. And sugar.

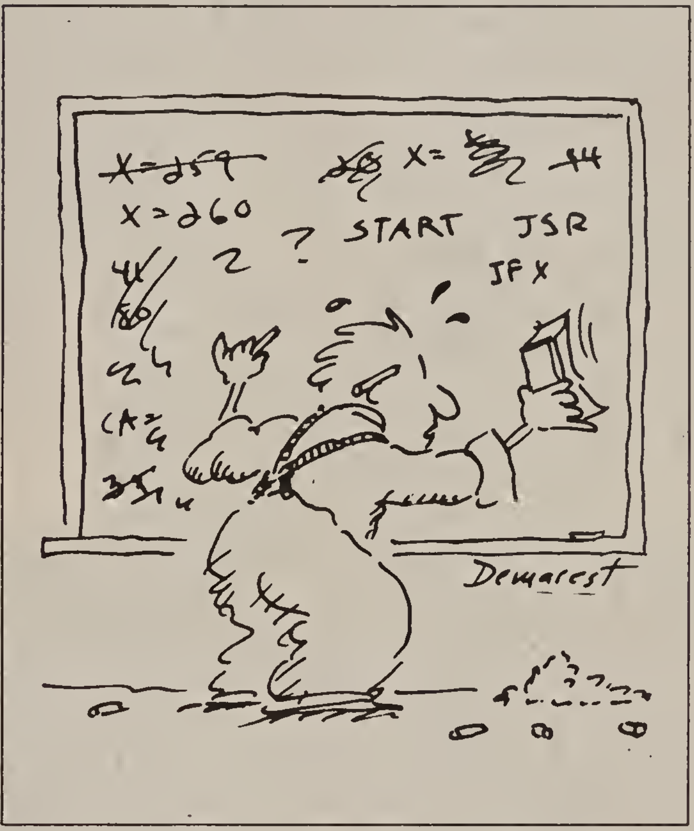


ILLUSTRATION BY CHRIS DEMAREST

Then when Buddy's cone arrived, Shirley seemed quite concerned that it was going to fall or drip. "I'll just trim off the extra," she announced, and proceeded to reduce Buddy's scoop to half its original size. Somehow, the excess went into her mouth.

In the meantime, Harrison offered her a "taste" of his banana split. "Just a taste," she said, but he insisted that she taste each of the three delicious flavors, plus each of the three syrups, some of the whipped cream, a bit of the banana and both cherries.

Before long, the dish was resting halfway between them, and she was using her coffee spoon to continue her "tasting."

She also sampled the other two children's sundaes, nobly eating the parts they didn't like. To wash all this down, she ordered a refill on coffee, then another, both with cream and sugar.

Somehow, there seemed to be a food magnet in her mouth, irresistibly attracting all loose food on the table. I found myself compelled to offer her some raspberry sherbet, but she was busy finishing one of the decorative cookies.

Later that evening, with the kids tucked into bed, we four adults sat around having a nice chat. Around eleven, Shirley asked if anyone was hungry. None of us were, but she slipped into the kitchen anyway.

When she returned with a plate of cheese, fruit and nuts, she announced, "Well, you guys all had ice cream,

About the author

Excerpted from Becoming a Technical Leader *by Gerald M. Weinberg. Copyright © 1986 by Gerald M. Weinberg. Reprinted by permission of Dorset House Publishing Co., Inc., 353 W. 12th St., New York, N.Y. 10014.*

OPUS2.
THE FIRST OFFICE-READY TERMINAL.

BUSINESS GRAPHIC CHARACTERS HELP
COMMUNICATE NUMERIC INFORMATION
PROCESSOR TIMING & DURATION
5000
4000
3000
2000
1000
100
90
80
70
60
50
40
30
20
10
Total Elapsed Time
Processor Utilization
Esprit

OPUS2, the first of a new generation. A terminal *ready to run,* designed to do the job and more.

Loaded with a *host of productivity tools,* OPUS2 has a pop-up calculator, WordStar† functions in memory, and pages of help screens *ready* for your customization.

The *office automation* keyboard has a feel all its own and an ingenious Rolodex*-like "flip strip" that makes function key labeling neat and easy. Simple to learn and use, the keyboard has extra space between the keys that make all the difference to the user.

The dark background video is crisp, clean and high contrast making OPUS2's flat 14 inch screen easy on the eyes.

A 1986 Industrial Design award winner, OPUS2 comes *protocol-ready* with all the most popular emulations†† built in.

With Esprit you get the *best support and service* in the industry. A 30-Month Guarantee that we will replace any terminal if it fails more than once…and an optional Esprit Express service that delivers a replacement to your office in 24 hours *if* you ever have a problem.

All this and more is OPUS2. The world's first and only Office-Ready terminal.

(800)645-4508
or (516)293-5600
in New York.

Esprit
OPUS2

Copyright 1986 Esprit Systems Inc. *Rolodex is a Registered trademark of Zephyr American Corporation. †WordStar is a registered trademark of MicroPro International. ††ADDS Viewpoint™, Televideo 910/920/925™, Wyse 50™, and our own Hazeltine 1500, Esprit II and ESP 6110+.

and I didn't have any."

"But you did," I observed, regretting it immediately.

Shirley regarded me with a puzzled look. "No. Don't you remember? I didn't order any ice cream. Just coffee." True, she had not ordered any ice cream, but didn't she realize that she'd eaten at least twice as much as anyone else at the table?

Self-blindness

For many people, work is like Shirley's eating. They waste time pursuing dead ends, dragging out phone calls or getting involved in useless arguments, yet never realize why they do not accomplish anything. Writers, for example, throw away many false starts or sit staring at a page without typing a single word. Many programmers, stuck in some fallacious argument, search for a single error long past the point where they should seek help.

I know that other people do those things (Dani and I watch them all the time), but I am sure that I do not do them — not very often, anyway. Wouldn't I remember if I did?

In fact, I would not remember, any more than Shirley could remember what she had for dessert. Like everyone else, I am quite unable to see myself in action, particularly when I am exhibiting my least productive behaviors.

Whenever I watch someone like Shirley not watching herself, my consciousness is raised, for a few days at least. I snack less and lose weight. But soon I stop watching again, and my spare tire starts to inflate. What I need is a consultant, someone to watch me eat and report to me what I cannot see for myself. The same is true for all of us. The only way we can see ourselves is through other people.

The inability to see ourselves as others see us is the number one obstacle to self-improvement. The great majority of would-be problem-solving leaders are stuck on this one obstacle. To surmount it, they must recruit others to help them. Probably the best way to get someone to watch you is by making a pact to watch that person in return. Even a mutual observing relationship is a rather delicate one, so it may take some time to develop a relationship that works well.

Whatever you do, keep it mutual. Don't ever volunteer your observations about people as I did with Shirley, no matter how helpful you think it would be for them. Shirley was nice enough not to punch me, but I was lucky.

Even when people ask for your observations, they will not always like what you have to say. I once asked Dani to watch my eating patterns. As an anthropologist, she's an expert observer — so good, in fact, that it almost broke up our marriage. It's just not much fun to be watched all the time, so whatever you do, do not pick your spouse as your watching partner.

No-Problem Syndrome

On the same trip that we visited Shirley, I encountered an example of the second obstacle that interferes with every effort to become a more effective problem solver. I call it the No-Problem Syndrome. I was in Sacramento, Calif., addressing the local chapter of the Data Processing Management Association. I began my address by talking about a previous visit to Sacramento 25 years earlier. It was my first business trip as a new employee at IBM, a visit I will never forget.

> ”
>
> ***The inability to see ourselves as others see us is the number one obstacle to self-improvement. The great majority of would-be problem-solving leaders are stuck on this one obstacle.***

The California state legislature had just passed a law allowing letters as well as numbers on license plates. Opponents of the law had argued that certain combinations of letters might prove offensive. The bill's backers promised to cull all offensive letter combinations from the plates, but they had no particular plan as to how to go about this. Somebody told them that a computer would be a big help, so they called IBM. That is where I came in.

I was a fresh young IBMer, all suited up and ready to purge the world of dirty words with a whiz-bang computer program. Unfortunately, the people from Motor Vehicle Registration had at least three requirements that I could not possibly satisfy:

- Some "offensive" words were not words in English but only looked like words in English. To understand this problem, drop one letter from your favorite four-letter expletive. Sometimes the new word is innocuous, but other times it is as offensive as the original.
- California had many ethnic groups speaking many different languages. The program was supposed to get rid of anything that might be offensive to anybody speaking Spanish, Chinese, Hebrew, Yiddish, Greek, French, Armenian and a few others I can't remember.
- We also had to remove words that might someday be offensive to anybody speaking any of these or any languages of anyone who might visit California.

I told the license plate story to

Today, total systems integration is the order of the day.
And departments that can't talk to departments are as isolated as Brooklyn before the bridge.
To find out how Wang bridged the communications gap for these organizations, call us. Toll free.

U.S.AIR FORCE
GRUMMAN®
FEDERAL EXPRESS®
Mellon Bank
SHEARMAN & STERLING

WANG

Wang is helping all these organizations become more efficient, more competitive. Because Wang, the vendor with an *integrated and compatible* line of VS minicomputers, is installing information networks that get departments talking to each other. Networks that have different computers communicating with each other like never before.
Wang helped all these organizations run smoother, run easier, run faster. And we can help you run the same way.
Call 1-800-225-WANG today, and let's talk.

WANG MAKES IT WORK.

© 1987 Wang Laboratories Inc

® A registered trademark of Grumman Corporation
The service mark "Federal Express" is used pursuant to a license agreement with Federal Express Corporation, the owner of the service mark

Why the new Midframe comp

It's like vintage champagne for the price of table wine.

Sperry is proud to present the 2200/200—the very first Midframe computer.

It's small, inexpensive and easy to use, like a minicomputer. Yet it has all the power and functions of a mainframe.

Perhaps the best way to describe it is "the best of both worlds." And that's just why we thought it deserved a category of its own: the Midframe.

Suppose you are looking for a departmental or single-solution computer. A minicomputer would be your natural choice.

But let us tell you why the Midframe would be a better choice. Like a minicomputer, our Midframe is small, requiring less space than an ordinary desk.

It's not fussy about temperature or humidity, so you can install it anywhere.

You can do it yourself, too, by simply connecting a few plugs.

It even plugs into a standard 220-volt outlet.

It's like a Concorde

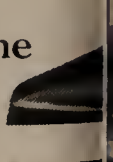
And like a minicomputer, the Midframe is easy to use. We've created a software package called SHIELD that lets just about anybody in your office use it, without extensive training.

What's more, it's priced like a minicomputer.

But to judge the Midframe by its performance, you'd swear you were looking at a mainframe. As a matter of fact, the Midframe is

It's like a concert grand that fits in the space of an upright.

It's like a family car with the power of a race car.



Anderson & Lembke

uter almost defies description.

powerful enough to serve as a host computer for most midsized companies.

In its most basic form, a single processor unit, the Midframe offers up to 6 Megawords (24 MB) of main storage, and more than a billion bytes of mass storage in the main cabinet. It can grow, as your computer needs do, into a four-processor system with 12 Megawords (48MB) of main storage.

you can fly yourself.

The Midframe offers enough capacity to support over 100 users running different applications at the same time. Just like a mainframe.

And it uses the same operating system that runs on Sperry's Series 1100 mainframes.

That means you'll have a full range of time-tested OS 1100 software products to choose from. (Including MAPPER,™ the tool that lets you create your own applications and maintain them—even if you've had no formal computer training!)

The Midframe offers enormous connectivity, not only to Sperry computers, but to those made by IBM and others.

If you're wondering how the Midframe can be both a mainframe and a minicomputer at the same time, there's a very simple answer.

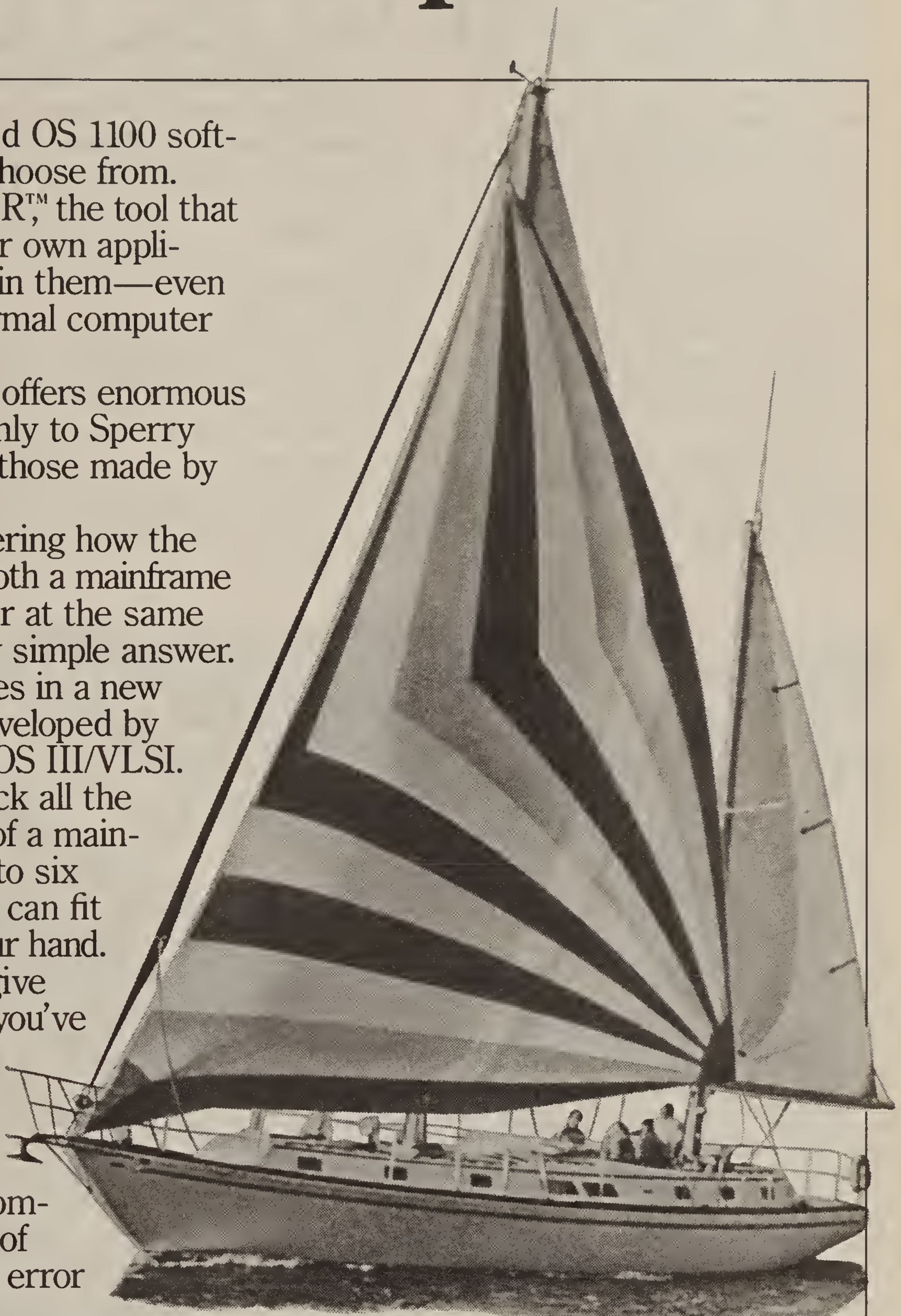
That answer lies in a new chip technology developed by Sperry, called CMOS III/VLSI.

This lets us pack all the processing power of a mainframe computer into six small chips, which can fit into the palm of your hand.

It also lets us give you some features you've never had before in any computer, micro, minicomputer or mainframe. Such as a complete duplicate set of chips to ensure full error containment.

If you're looking for a departmental computer, consider a Midframe. It offers you mainframe capability for about the same money as a minicomputer.

And if you are looking for a host system, the Midframe is a mainframe that can grow with you, at far less than you'd expect to pay.



It's like a dinghy that can grow to the size of a ketch.

Would you like to know more about the Midframe?

Just call Sperry today toll-free at 1-800-547-8362 Extension 8.

Or write to Sperry Customer Service Center, PO Box 1804,
West Chester,
PA 19382.

SPERRY

MAPPER is a trademark of Sperry Corporation.

> ”
>
> ***NPS seems to affect a large percentage of computer professionals. Whenever they hear the words 'problem' and 'computer' in the same sentence, they launch into a diatribe . . . And it always starts with the words, 'No problem.'***

kick off a discussion of what makes problems diffcult to solve. Then I distributed a set of problems for everyone to try. As I circulated through the room to see how everyone was doing, I noticed one man sitting conspicuously with his arms folded tightly across his chest.

"Have you finished already?" I asked him.

"No," he said. "I'm not doing them. Why waste my time? Why don't you just hurry up and tell us what it is you're trying to tell us?"

"I can't tell you," I said, "because I want you to feel the frustration of trying to do certain kinds of difficult problems. Telling you just isn't the same."

"Well, you might as well tell me, " he countered, "because I can solve any problem you can give me. In fact, your 'unsolvable' license plate problem is actually trivial."

"Trivial?" I asked.

"Absolutely. With modern technology, all you need is a big dictionary. You pass the combinations of letters against the dictionary and eliminate the ones you don't want. It's just no problem."

My first instinct was to argue. I might have asked him how he was going to get a dictionary of words that had not been coined yet. Or why you would bother with a computer, once you had constructed a dictionary of offensive words. Then I realized that the poor man was suffering from a severe case of No-Problem Syndrome, or NPS for short. I had suffered from this disease myself, so I had nothing but sympathy for the poor man. I don't get any kicks out of attacking the handicapped, so I simply smiled and walked away.

Perhaps you have never heard of NPS? I have not checked this with any neurophysiologist, but it seems to be a condition in which the ears are not properly connected to the brain. The sounds enter, but they trigger a sterotyped response that has nothing to do with their meaning. One person describes a vexing problem, but the other merely responds with a callous "No problem."

No-Problem Syndrome is not the same as deafness. In fact, deaf people couldn't have NPS because the response has to be triggered by the key word "problem" reaching the ear. Once that word registers, the ears become selectively deaf, the first stage of the syndrome. The second stage seems to be the mental retrieval of some favorite solution method, which is immediately presented to the talker, even if it is necessary to interrupt him.

My uncle Max had NPS, and his favorite solution had to do with restoring the practice of beating children in the public schools, much as he beat his children at home. If the economy was down, it was because they don't beat kids in school any more. If crime was up, or the weather was bad, it was the same reason.

Heartbreak

Like most kids, I didn't understand the heartbreak of NPS. I used to laugh at my uncle, never dreaming that NPS might be hereditary. Because I lacked self-awareness, it was not until after my first visit to Sacramento that I found out the tragic news: I had NPS myself.

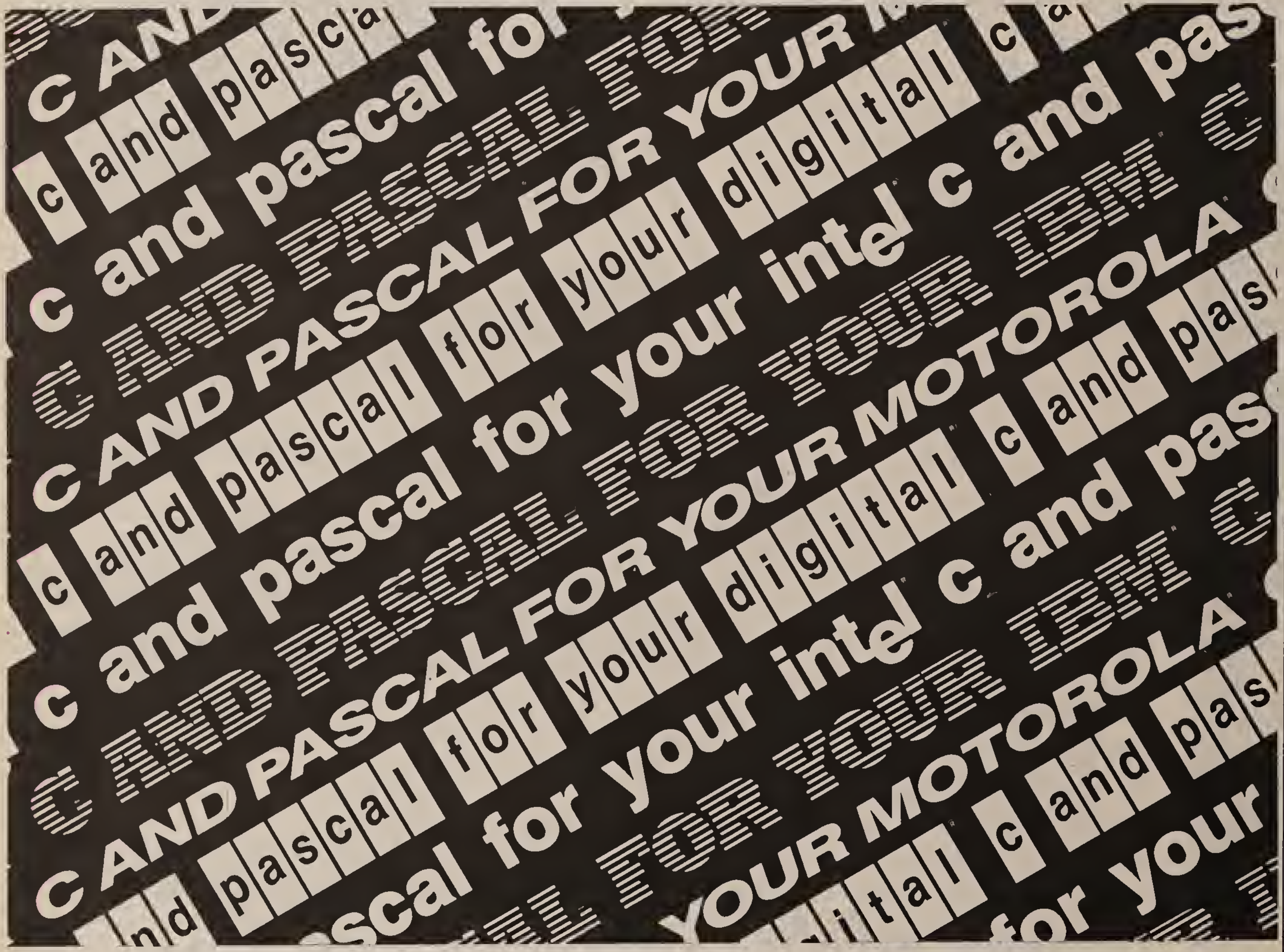
It was the license plate problem that revealed my terrible secret. The motor vehicle people told me about their requirements, but evidently their words never registered in my brain. Before they had finished talking, I had assured them that there was no problem. Before I understood what their problem was, I had managed to write a program to solve it.

You can imagine what a blow it was to a young IBMer when a bunch of civil servants rejected all his brilliant work. On the other hand, you can imagine what a blow it was to them when a young IBMer, not even listening to their requirements, told them they did not really have a problem. It may be terrible to have NPS, but it is even worse to be in contact with one of its victims.

I used to think that computers emit some nerve-damaging high-frequency sounds because NPS seems to affect a large percentage of computer professionals. Whenever they hear the words "problem" and "computer" in the same sentence, they launch into a diatribe that would put old uncle Max to shame. And it always starts with the words, "No problem."

As I grew older, however, I realized that computers themselves do not actually cause NPS. Perhaps it is the fast pace of the industry, which reduces the likelihood that problem solvers will take time to be aware of what they are doing. Besides, I have noticed that NPS afflicts people in all high-tech industries, so it cannot just be computers. It also affects quite a few people in low-tech industries, or people not in industries at all.

My own symptoms have abated a bit with age, so perhaps the problem is simply a manifestation of the youthfulness of the computer industry. Other than senility, though, I do


c and pascal for your digital
C AND PASCAL FOR YOUR IBM
c and pascal for your intel
C AND PASCAL FOR YOUR MOTOROLA

Whitesmiths, Ltd. Has The Compiler You Want On The Machine You Use.

For over seven years Whitesmiths, Ltd. has focused its efforts solely on developing and supporting a family of quality systems software. Today, Whitesmiths is the only company offering compatible C and Pascal native and cross compilers for the full spectrum of computers on the market—from the IBM PC to the IBM 370, from the DEC Micro-11 to the VAX 8600, and all of the most popular processors in between.

As a forerunner in the development of C and Pascal compilers, Whitesmiths has played a major role in defining and refining the standards for ANSI C and /usr/group libraries.

The result is a product line built from the ground up to provide a uniform environment for the professional applications developer. Identical source code across all machine architectures; support for ROM-based programs; a uniform run-time environment; and the ability to mix code in assembler and other high level languages are just a few of the many features that comprise these superior compilers.

If you need a C or Pascal compiler for your machine, give Whitesmiths a call at **1-800-225-1030.** Chances are, we have what you want.

Whitesmiths, Ltd.

97 Lowell Road, Concord, MA 01742 • (617) 369-8499 / Telex 750246

INTERNATIONAL DISTRIBUTORS **FRANCE**, COSMIC S A R L , 52 Quai des Carrieres, 94220 Charenton Le Pont, Paris, (14) 378-8357 • **GERMANY**, GEI, Gesellschaft fuer Elektronische Informationsverarbeitung MBH, Pascalstrasse 14, D-5100 Aachen, 02408/13-0 • **JAPAN** Advanced Data Controls Corp , Nihon Seimei Otsuka Bldg , #13-4, Kita Otsuka 1-Chome, Toshima-ku, Tokyo 170, (03) 576-5351 • **SWEDEN**, Unisoft AB, Fiskhamnsgatan 10, S-14155 Goteborg, (31) 125810 • **UNITED KINGDOM** Real Time Systems Ltd , P O Box 70, Douglas, Isle of Man, (624) 26021

Packed and ready to go.

The WYSEpc+. Complete with everything that makes all others incomplete.

Now you can have a pc that's *twice* as fast as an IBM PC XT, yet fully compatible. Plus more memory, extra ports and a built-in graphics adapter.

Because on the WYSEpc+, all the most-wanted upgrades are standard.

And even while raising the standards, the WYSEpc+ still gives you two full-size expansion slots for your special applications. Plus your choice of an IBM PC AT-style or Enhanced-style PC keyboard.

All this, at Wyse prices. From the company offering a full line of display products.

Take a look at the chart and you'll see why the WYSEpc+ is sending the others packing.

Write Wyse Technology, Attn: Marcom Dept. pc+, 3571 N. First Street, San Jose, CA 95134. Or call toll-free, today, for more information.

Call 1-800-GET-WYSE

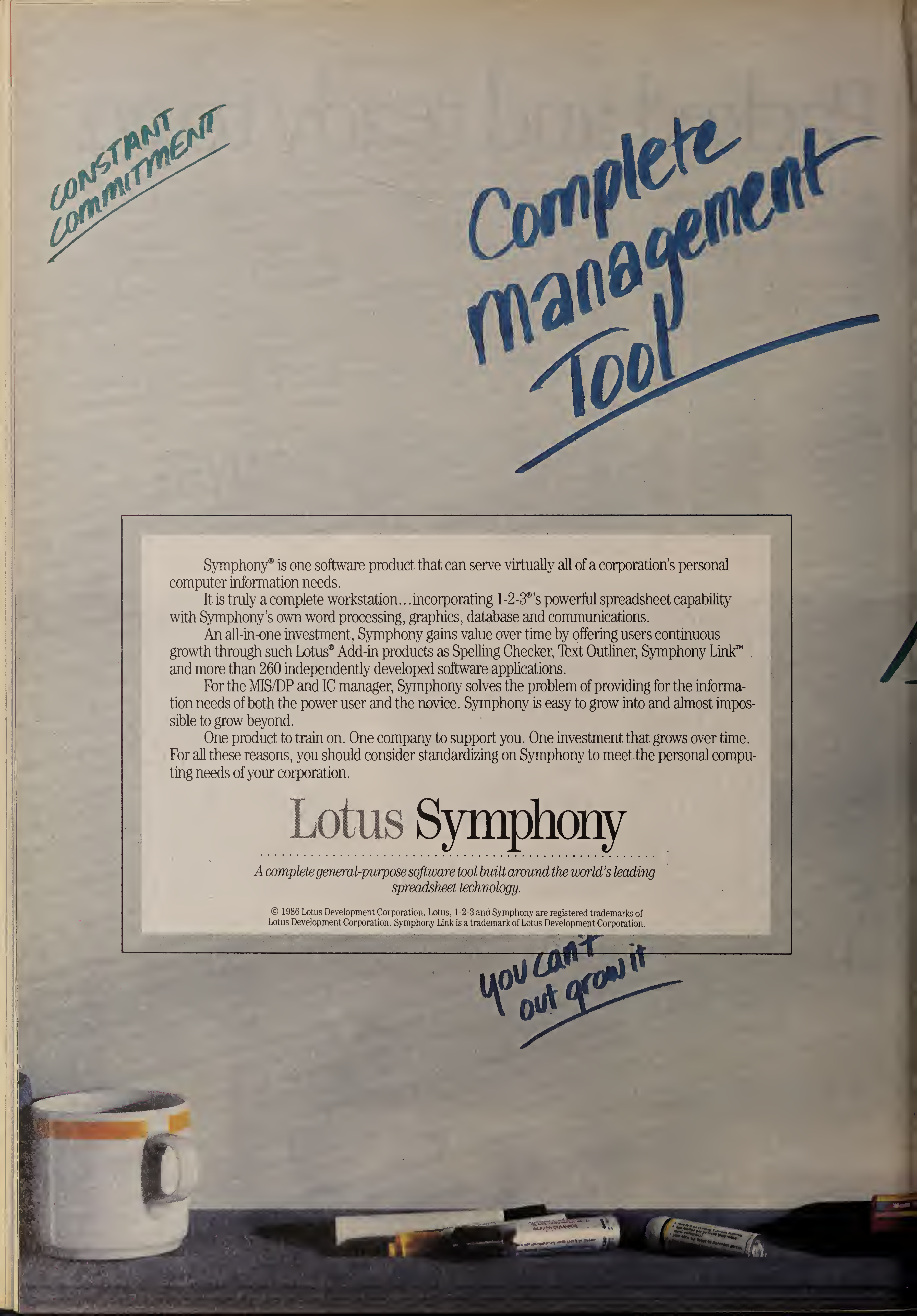
WYSE

YOU NEVER REGRET A WYSE DECISION.

	WYSE WYSEpc+	ATT PC 6300	COMPAQ DESKPRO	EPSON EQUITY I	LEADING EDGE MODEL D	ZENITH Z-158
CPU	8088	8086	8086	8088	8088	8088
Maximum CPU Speed	9.54MHz	8MHz	7.14MHz	4.77MHz	4.77MHz	8MHz
Selectable 4.77MHz Mode	Yes	No	Yes	—	—	Yes
Standard Memory	640KB	640KB	256KB	640KB	512KB	256KB
Standard Ports	2S, P	S, P	P	S, P	S, P	S, P
Monochrome/Color Graphics Adapter	Yes	Yes	Mono only	Optional	Optional	Optional
Accessory Slots After Configuration*	2	5	1	3	2	2
MS-DOS Included	3.1	2.11	Optional	2.11	Optional	Optional
Choice of Keyboard	AT, ENHANCED	PC XT	PC XT	PC, AT	PC XT	PC XT

Comparative specifications as of 8/86. *Configuration includes 640K memory, display adapter and hard disk controller.

WYSE is a registered trademark of Wyse Technology. WYSEpc+ is a trademark of Wyse Technology. IBM and Personal Computer AT are trademarks of International Business Machines Corporation. MS-DOS is a trademark of Microsoft Corporation. © 1986 Wyse Technology.



Symphony® is one software product that can serve virtually all of a corporation's personal computer information needs.

It is truly a complete workstation…incorporating 1-2-3®'s powerful spreadsheet capability with Symphony's own word processing, graphics, database and communications.

An all-in-one investment, Symphony gains value over time by offering users continuous growth through such Lotus® Add-in products as Spelling Checker, Text Outliner, Symphony Link™ and more than 260 independently developed software applications.

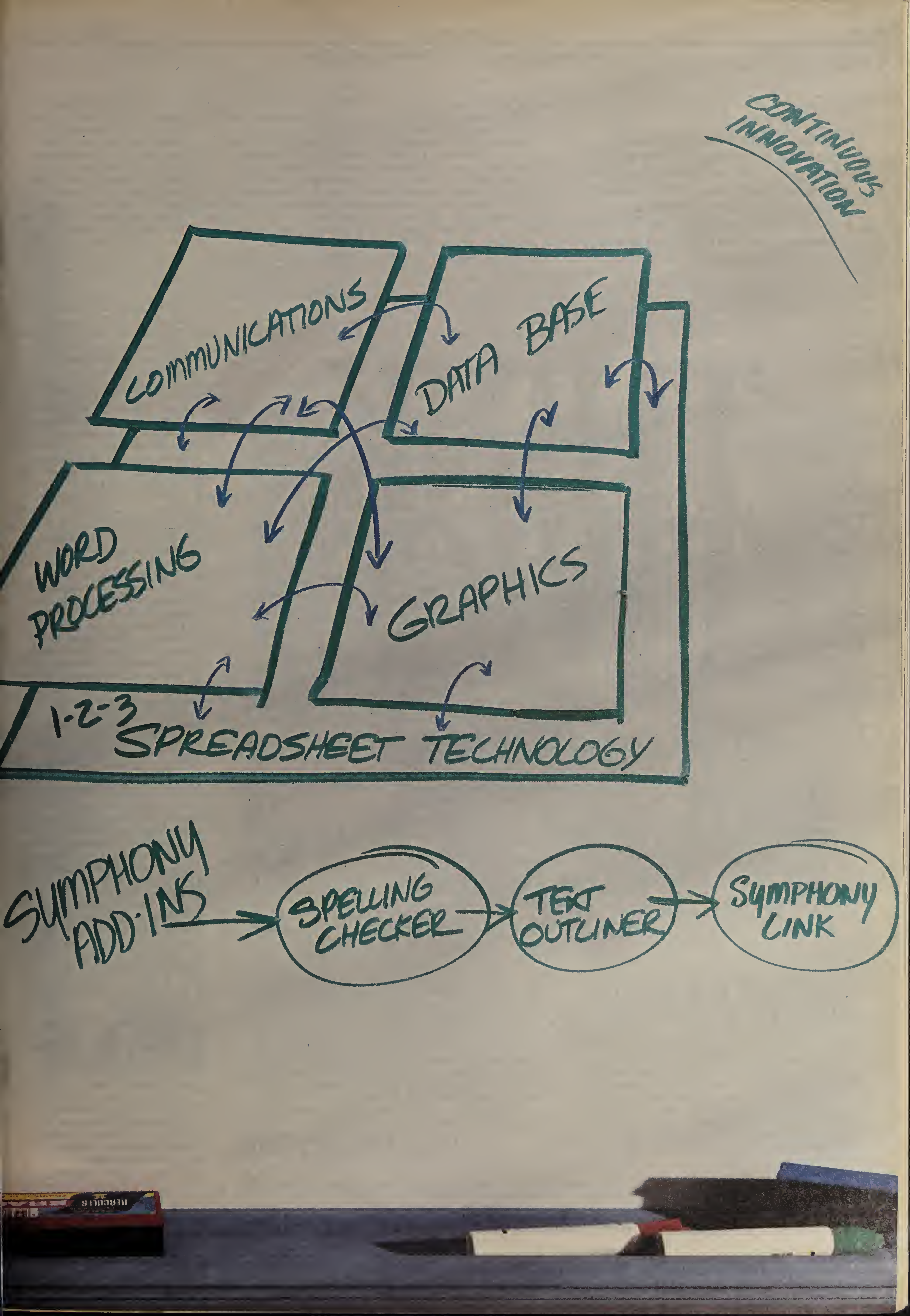
For the MIS/DP and IC manager, Symphony solves the problem of providing for the information needs of both the power user and the novice. Symphony is easy to grow into and almost impossible to grow beyond.

One product to train on. One company to support you. One investment that grows over time. For all these reasons, you should consider standardizing on Symphony to meet the personal computing needs of your corporation.

Lotus Symphony

A complete general-purpose software tool built around the world's leading spreadsheet technology.

© 1986 Lotus Development Corporation. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation. Symphony Link is a trademark of Lotus Development Corporation.


CONTINUOUS INNOVATION
COMMUNICATIONS
DATA BASE
WORD PROCESSING
GRAPHICS
1-2-3
SPREADSHEET TECHNOLOGY
SYMPHONY ADD-INS
SPELLING CHECKER
TEXT OUTLINER
SYMPHONY LINK

> ”
>
> ***The central dogma of academic psychology is: There is one and only one correct solution to every problem . . . For a would-be problem-solving leader, belief in the central dogma is a debilitating disease and the third great obstacle to becoming a star problem-solving leader.***

not know of any cure for NPS. I wish I could help these poor handicapped souls, but bitter experience has taught me that I would have more success going to Sri Lanka to cure lepers.

People who have problems for others to solve should be better informed about the perils of NPS. Because it cannot be cured, they had better learn to protect themselves through my four-step plan for early NPS detection:

1. You describe your very difficult problem.

2. The respondent says, "No problem."

3. You say, "Oh, that's terrific. *Could you please describe my problem that you're going to solve?*"

4a. If the respondent then describes your problem, even erroneously, it is not a case of NPS but only a case of Enthusiasm.

4b. If the respondent describes a proposed *solution* to your problem rather than the problem itself, then sadly it is NPS. The kindest thing you can do for all concerned is smile and walk briskly to the nearest exit.

Sometimes the four-step detection plan can be used for self-diagnosis, but if the NPS is too far advanced, the plan will not work. To detect your own NPS, you have to be able to hear yourself say, "No problem." or or at least hear yourself giving solutions before you have confirmed that you understand the other person's problem. But, alas, terminal NPS patients cannot hear other people very well; and they cannot hear themselves at all. They are not only self-blind, they are self-deaf.

Single-solution belief

We could characterize NPS as the unshakable belief in your own master intelligence. This definition makes it clear why NPS is the number two obstacle to becoming an innovative leader. The Chinese say that the first step to knowledge is a confession of ignorance. If you already know everything, how will you ever learn anything?

Even though you should not believe you know everything, it does help to know something. Nobody denies that good problem solvers have to be intelligent, but lack of intelligence is not one of the three big obstacles. We all know many high-IQ people who are not good at solving real-life problems. Perhaps we ought to be more skeptical about the procedure by which psychologists identify intelligence.

Recently, a science magazine ran a "Mind Benders" column prepared by Mensa, an organization of people who score in the top 2% on standardized IQ tests. Among the Mind Benders were the following two questions, which bent my mind in a direction perhaps not intended by Mensa.

1. All the secretaries in my office are under 21. All the young ladies in my office are very beautiful. My secretary has long blond hair and blue eyes.

Which statement(s) below can be justified by the information given?

a) My secretary is under 21.

b) My secretary is a beautiful young lady.

c) Neither of the above.

d) Both of the first two.

2. In a certain field, there are both horses and men. There are 26 heads and 82 feet (or hooves) in the field. How many men are there? How many horses?

Here are the answers:

1. The "correct" answer is given as (a) my secretary is under 21. What's supposed to trip you up is the assumption that all secretaries are female, which is not stated. But what about the assumption that my secretary is in

THINK TWICE

AVAILABLE ON UNIX
System 5 and BSD 4.2

...BEFORE YOU SETTLE FOR SAS.® Have you found your application solution? Think twice...if you haven't found SPSS-X.™ Does your staff spend time doing what users might do for themselves? Provide them with the tools and support from SPSS.

For end users, SPSS has 20 years' experience providing fourth generation solutions. Data management, statistics, tables and report writing. And interactive graphics and maps with SPSS Graphics.™ Nearly three quarters of a million users agree. Speak plain English—not a programming language. Rely on superb documentation, training and a technical hot line.

For DP professionals, satisfied users increase staff productivity. And SPSS-X is the system staff's own tool to track resource utilization and spot performance problems. SPSS-X runs faster and conserves machine resources, so performance won't suffer when SPSS-X goes to work.

For all users, SPSS-X is part of an integrated family of products available in over 40 different computing environments, from mainframe to micro. Satisfy your micro users with the market leader, SPSS/PC+, including complete SPSS-X mainframe communications.

So think twice before you settle for less than SPSS-X. Contact our Marketing Department today.

CALL 1/312/329-3660

SPSS inc.

SPSS Inc. • 444 North Michigan Avenue, Suite 3000 • Chicago, Illinois 60611
In Europe: SPSS Europe B.V. • P.O. Box 115 • 4200 AC Gorinchem, The Netherlands • Telephone: +31183036711 • TWX: 21019

SPSS-X is available on IBM MVS (OS), CMS, DOS, Digital 10, 20, VAX/VMS, VAX/UNIX, Prime, Sperry 1100; Data General MV-series; Control Data, Honeywell Large Systems, Hewlett-Packard 9000; Cray; and UNIX V and BSD 4.2. Coming soon on Hewlett-Packard 3000, Burroughs Large Systems, and Wang VS systems. SPSS, SPSS-X, SPSS Graphics and SPSS/PC+ are trademarks of SPSS Inc. for its proprietary computer software. SAS is a registered trademark of SAS Institute, Inc.

© 1986, SPSS Inc.

my office? It does not say that, but then it does not say my secretary is female.

Depending on which set of assumptions you choose, all four answers are possible. Although I've never personally had a male secretary, I have worked in situations where my secretary was in another office, even in another city. Does this make me less intelligent than the psychologist who posed the question?

2. By simple algebra, you get the official answer (15 horses and 11 men) if you assume that each horse has 4 feet and each man has 2. I don't know much about horses, but I read this test after watching a Veterans Day parade. It was obvious to me that one possible solution is 16 horses and 10 men, one of whom is a Vietnam veteran with no legs. Of course, there are lots of other solutions along this line, if you are not a psychologist.

Any intelligent being who has been exposed to this sort of testing has experienced the same frustration: You can think of several possible answers, but you know the psychologists want only one; and you are not allowed to ask questions.

It is not so bad when the questions are in a magazine just for fun or even in the Mensa admission test. But what if you want to get into college, or get a job or get into a favored track in the second grade? The psychologists hold the power to keep you from getting what you want, and their power is unquestionable.

Quite possibly, academic psychology is the most arrogant profession of all time. We already encountered the central dogma of academic psychology: There is one and only one correct solution to every problem — and the psychologist knows it.

This dogma applies equally to tests for people or mazes for rats. Any rat who displays a modicum of suspicion for the psychologist's setup runs the maze a little slower and is labeled less intelligent. To me, anyone who *fails* to be suspicious of psychologists' experiments should be labeled less intelligent.

The central dogma is damaging enough to the individual person or rat trapped by the psychologist, but its long-range effects on society may be even worse. Schools and employers reward people whose thinking happens to match the thinking of psychologists, so people either learn to think that way or find themselves out in the cold. After a while, we find people in problem-solving situations who literally believe that every problem has one and only one solution, a solution so inevitable that they will recognize it when they find it.

For a would-be problem-solving leader, belief in the central dogma is a debilitating disease and the third great obstacle to becoming a star problem-solving leader. Infected designers rarely consider an adequate number of alternative designs and never consider testing the design other than by their own intuition. Infected programmers are powerless in the face of a bug that deviates in any way from the obvious answer.

Managers infected by the central dogma act like psychologists; they assign work to their subordinates and expect to have it done in one right way — their way. Before long, they create another generation in their own image.

A closed system

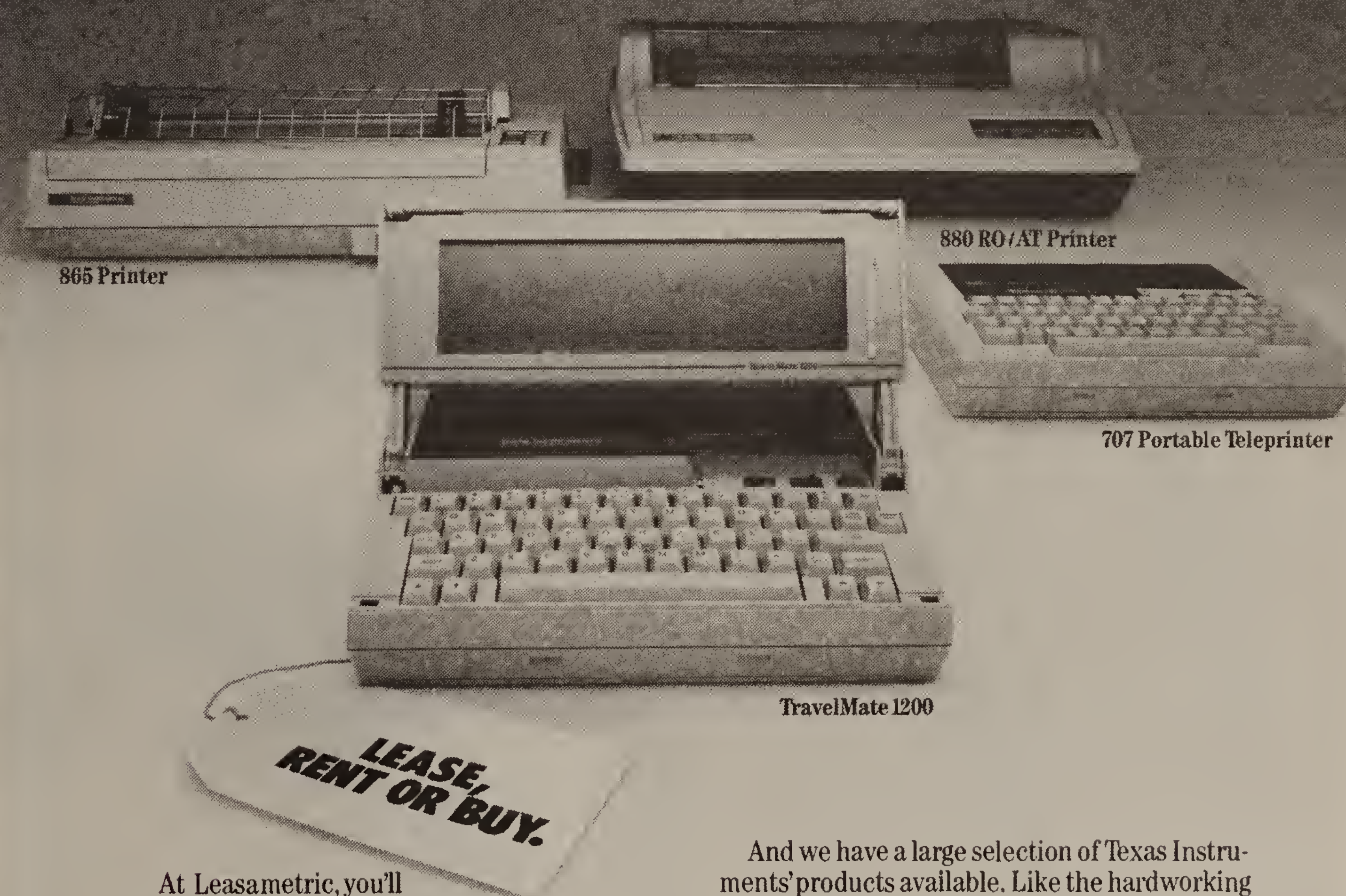
They're worth summarizing, these three great obstacles to innovation:

- Self-blindness, concealing these three great obstacles to innovation.
- No-Problem Syndrome, convincing you that you already know the answer to all problems.
- Belief in the central dogma of academic psychology, blinding you to alternative solutions, even ones you could generate without help from anyone else.

These deeply imbedded obstacles form a closed system, standing in the way of their own removal. People who are self-blind might read this list and nod their heads in agreement, but about other people. People who suffer from NPS will not even read the list in the first place. People who believe the central dogma will already be on what they consider to be the one and only path to success.

So let's bid those people goodbye and concentrate on those for whom there is still some hope. Let's stick with you creative people who know the double enjoyment of watching what you are doing while you are doing it and laughing at yourself while you watch. ■

The best way to buy T.I., even if you don't buy it.



At Leasametric, you'll always get the best buy on T.I.

Even if you rent or lease, instead.

We have competitive prices. Plus a finance plan that fits your tax plan. Like long- and short-term rentals. Fair-market-value and finance leases. Even buying outright, on both new and used equipment.

Whatever's best for your bottom line.

Service is available, too. Including installation, on-site maintenance, return-to-depot programs, time-and-materials, plus a toll free number for on-line diagnostics.

And we have a large selection of Texas Instruments' products available. Like the hardworking dot matrix printers, and portable teleprinter shown above. Just ask for any of the 800 or 700 series printers, and take your choice.

Or, take a look at our newest addition to the family, T.I.'s portable TravelMate 1200. With loads of memory, internal modem, large screen and built-in printer, it's the perfect computer for today's on-the-move executive.

So get the details. Call. Ask about plans and products.

Then get the best buy on T.I. Without even buying.

TEXAS INSTRUMENTS
COMPUTING PRODUCTS
AUTHORIZED LEASING

LEASAMETRIC®
Data Communications Division

Northern California & Pacific Northwest—(415) 574-5797 • Southern California—1-800-638-8574
Rocky Mountains—1-800-638-7854 • Southeast—1-800-241-5841 • Central—1-800-323-4823 • Northeast—1-800-221-0246

BRING THE WORLD TO YOUR KEYBOARD.

Telexpro sends hard copy messages from your S/38 terminal — across the globe or across the hall.

Telexpro ties your telex lines to your S/38 with a single twinax cable. Send hard copy anywhere, instantly, with no new IBM equipment or special training.

Call toll-free for your free user guide: 1-800-328-1000, ext. 125.

HELP/38 SYSTEMS
210 Baker Technology Plaza
6101 Baker Road, Minnetonka, MN 55345
612/933-0609 Telex: 290184

There's a present for you in Computerworld's 1000th issue.

And it comes with the future.

When Computerworld's 1000th issue takes a special look at the ongoing story of the computer, you can take advantage of some very special rates.

At Computerworld, we're celebrating our 1000th issue, marking more than 19 years as the computer industry's most respected publication.

So we're putting together a special issue for November 3. In addition to our regular editorial content, we'll also include a special section devoted to the continuing impact of the computer on the world.

This extra special issue, with its in-depth look at the future of computers in the world's society, promises to quickly become a collector's item. That alone makes it an outstanding buy in your media schedule. But there's much more.

Every ad you run entitles you to an ad of equal size at just $1 a line.

Whether you run in our regular editorial section *or* the special section at our regular rates, you can get an ad of equivalent size in the other section for only $1 a line. Plus standard premiums for color.

So you can double your coverage for next to nothing.

And your value gets even better as we add bonus circulation at Comdex and ADAPSO. We'll also be handing issues to visitors at Boston's Computer Museum.

But hurry, because the present never seems to last.

The closing date for this November 3 issue—for advertisers who want to take advantage of the special offer of $1 per line—is October 10. Advertisers not wanting to participate in this offer may observe the closing date of October 17 for color, premium positions, inserts, etc. and October 24 for b/w space for the regular editorial section. To reserve your space—and special matching space—call Ed Marecki, Vice President/Sales, Computerworld at 617-879-0700 or your Computerworld representative today.

COMPUTERWORLD

Issue: November 3. Closing: October 10.

Chrysler Motors: Using 30 Cybers to bounce back

By JEAN BOZMAN

Five years ago, Chrysler Corp. was given just months to live by automotive industry analysts. Its sales were poor, it suffered billions of dollars in losses and analysts said its latest models were hard to distinguish from competing vehicles built by General Motors Corp. and Ford Motor Co.

Those were Chrysler's darkest days, just before the federal government approved a $1.2 billion loan guarantee to save the company from bankruptcy. It was also when Chrysler's computer planners decided to spend tens of millions of dollars on sophisticated computer systems.

> *'Every day, 800 people use the system to generate realistic-looking models of a car that doesn't exist. You can show these prototypes to top management, and they can pick which cars they like.'*
>
> — Glen Bibbins
> Chrysler Motors

The huge planned expense, which would carry the company well past the first scheduled loan repayment in 1990, was more strategic than ironic. Building on a base of more than a dozen Control Data Corp. mainframes, computer planners began to devise a strategy that would one day incorporate end-to-end computer-integrated manufacturing (CIM) and lift Chrysler out of a hole and into a competitive position.

Building such a powerful computer resource was Chrysler's way of saying that it intended to stay among the top three U.S. car manufacturers, alongside GM and Ford.

By 1985, the company had bounced back, aided by falling interest rates, a rebounding economy and solid sales based on a stronger product line. Chrysler, with $21 billion in sales, ranked 13th in the Fortune 500 industrials last year, its revenue equal to about half that of Ford and less than one-quarter that of GM.

Four computer centers

The repository of all the hardware at Chrysler is the Technical Computer and Instrumentation Center, located just blocks from the company's administration building and Chairman Lee Iacocca's offices. Chrysler has amassed 27 of CDC's Cyber 180 mainframes in its 36,000-sq-ft computer room at the Highland Park, Mich., facility and three more out in the field.

PHOTO COURTESY OF CHRYSLER CORP.

Robert Brauburger of Chrysler's Technical Computer and Instrumentation Center.

"From 1979 to 1983, the company spent the money on technology when they weren't spending it on anything else," says Robert Brauburger, chief engineer at the Technical Computer and Instrumentation Center. Software design accelerated anew in 1981, just as Chrysler approached bankruptcy. But the financial picture improved considerably by 1983, when Iacocca was able to hand over Chrysler's first repayment of the federal loan.

Later that year, Chrysler ordered a new CDC Cyber 205 supercomputer worth more than $10 million. In 1984, the company added nine more CDC mainframes at a total cost of $11.5 million.

More than a sandbox

The massive computer room impressed visitors, but many observers inside the company saw it as an unjustified expense during lean years. "Some people thought it was a sandbox for us to play with," Brauburger says. "But it wasn't. We designed cars with it."

The Technical Computer and Instrumentation Center is one of five primary computer centers within Chrysler. Three are IBM shops devoted to handling customer orders, accounting, purchasing materials and administration in the Detroit area. Among the IBM mainframes Chrysler owns are several 3090s running IBM's MVS/XA operating system and DB2 relational data base management system. An IBM 4381 at the Technical Computer and Instrumentation Center acts as a link between the CDC world and the IBM Systems Network Architecture (SNA) world.

"We use that 4381 as a gateway," says G. Nicols Simonds, director of MIS for Chrysler. "It allows the Technical Computer Center and the IBM computers to share files."

The fifth computer center, the Outer Drive Manufacturing Development Center in Detroit, uses a Digital Equipment Corp. VAX-11/780 for additional design functions. In the Chrysler factories themselves, more satellite computers, most of them IBM 4300s or Series/1 minicomputers, control operations.

The four major computing centers, scattered throughout the greater

---

Bozman is a Computerworld *contributor based in Chicago.*

Detroit area, are linked by T1 carrier lines. In this way, the sites can send backup files to each other, protecting Chrysler against irreparable data loss should a disaster occur at one of the sites.

At the Technical Computer and Instrumentation Center, about 2,500 Chrysler designers and engineers can access what amounts to a single, virtual computer system with a processing capability — not including the Cyber 205 supercomputer — of 98 million instructions per second (MIPS). The center's communications network reaches out to remote Chrysler locations in Syracuse, N.Y., and Huntsville, Ala., and to factories elsewhere in the U.S and in Canada and Mexico.

> ”
>
> ***Building a powerful computer resource was Chrysler's way of saying it intended to stay among the top three, alongside Ford and GM.***

Brauburger and other Chrysler managers do not judge the value of their computer systems by MIPS alone. Instead, they look at the amount of work they can get done — and the productivity gains they deliver.

Because of the Technical Computer and Instrumentation Center's power, the company has cut its time to market dramatically. Designers can now dream up cars, outfit them with various components, crash-test them and then discard the design if necessary and start again. This can all be done on-screen, without ever having to build a clay model of the automobile. Another practical effect: Chrysler's managers get to see prototype cars a lot sooner than they did in the past.

"Let's say a vice-president of engineering wants to look at the designs," Brauburger explains. "He wants to see information from various types of computers, and he wants to see it right away. We're working on interfaces between the systems so that executives can get that kind of information from the terminal right on their desks."

But the beefed-up computer resources do much more, Brauburger and other Chrysler computer executives believe. The supercomputers increase productivity of Chrysler's designers and engineers by a throughput gain of 25% to 30% every three years. With the help of the supercomputers, drafting time has been reduced by a factor of 70-to-1. For some engineering tests, for example, a four-month process of building and testing a physical model is reduced to a one-day computer simulation.

AT A GLANCE

CHRYSLER MOTORS

Net Sales -1985: $21.26 billion
1986: $5.78 billion (first quarter),
$5.7 billion (second quarter)

Net Earnings -1985: $1.64 billion
1986: $356.9 billion (first quarter),
$488.2 million (second quarter)

Market Share -1985: 11.4%, cars; 12.8%, trucks
1986: 11.5%, cars; 12%, trucks (through second quarter)

Capital Expenditures -1981-1985: $4.7 billion
1985-1990: $12.5 billion (projected)

The productivity gains — typically a ratio of 3-to-1 or better — have been climbing during the past two years. The 1984 addition of the Cyber 205 alone more than tripled Chrysler's computer-aided design (CAD) resources.

A nonrestrictive choice

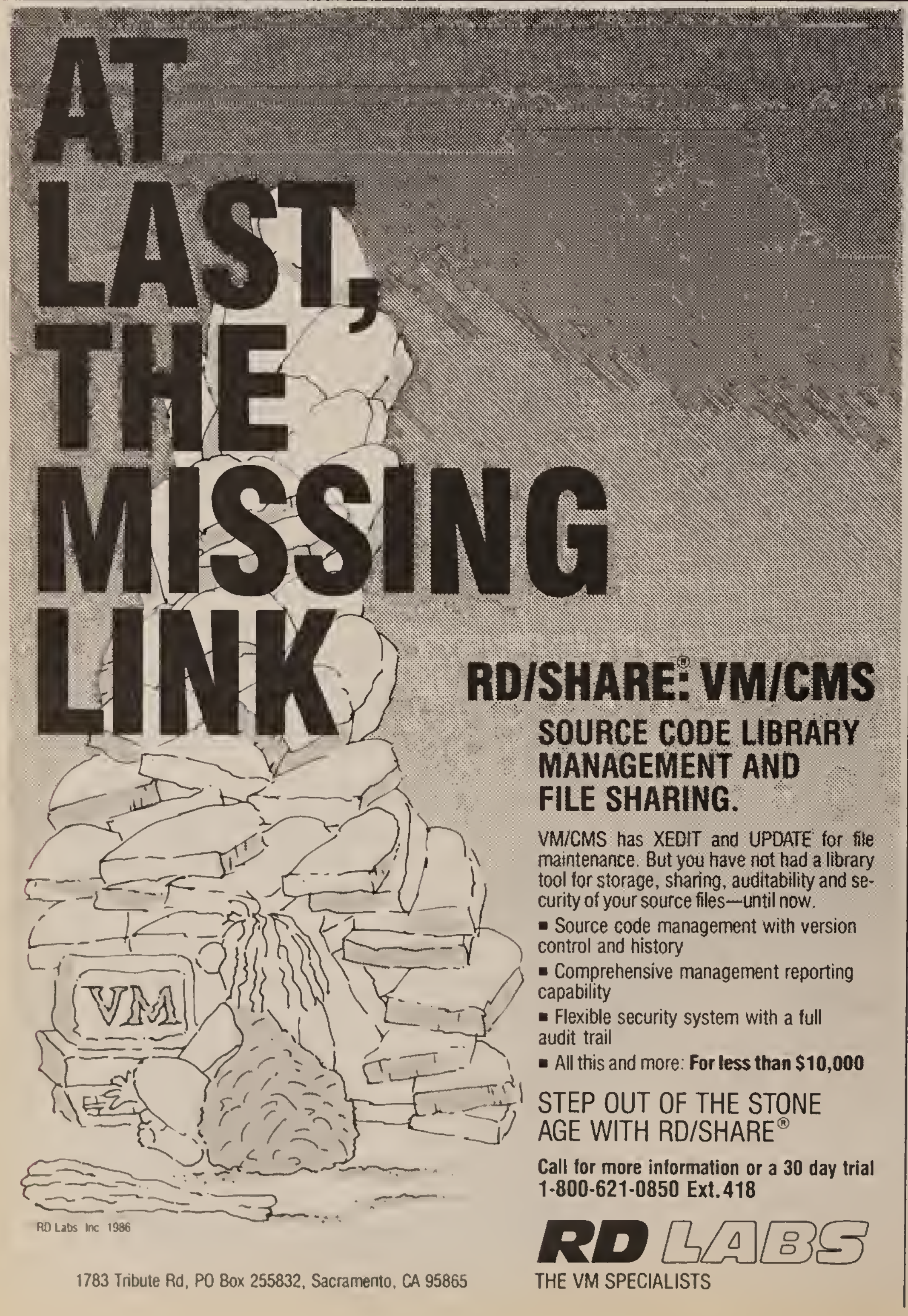
The Cyber 205's simulation capabilities, its 64-bit architecture and its ability to do high-speed vector calculations played a part in Chrysler's choice of CDC computers to provide a design and engineering solution. The automotive company chose CDC at a time when IBM and IBM-compatible suppliers like National Advanced Systems Corp. and Amdahl Corp. did not provide vector processors in their standard mainframe line.

Choosing CDC did not lock Chrysler out of the IBM world. Corporate MIS at Chrysler uses IBM mainframes and an SNA communications network. The combination of the CDC Loosely Coupled Network (LCN) product with an IBM 4381 on-site at the Technical Computer and Instrumentation Center allows engineering to send technical reports to the corporate IBM computer room down the street.

It is Brauburger's contention that the configuration within the Technical Computer and Instrumentation Center — a series of CDC mainframes linked by fiber-optic cable and twisted-pair wire — gives Chrysler maximum flexibility.

It allows Chrysler engineers to gain access to machines by IBM, Digital Equipment Corp. and other vendors, whether the computers are remote or not. Console operators control access to each of the computers by assigning logon identification codes.

Usually, a department will restrict its work to two or three of the mainframes, but individual users may skip around the mainframes if they like. Users must specifically request a Cyber if it is not designated for their group. For example, the designated computer may be called N1 and the desired computer N12. Users



AT LAST, THE MISSING LINK
VM

RD/SHARE® VM/CMS

SOURCE CODE LIBRARY MANAGEMENT AND FILE SHARING.

VM/CMS has XEDIT and UPDATE for file maintenance. But you have not had a library tool for storage, sharing, auditability and security of your source files—until now.

- Source code management with version control and history
- Comprehensive management reporting capability
- Flexible security system with a full audit trail
- All this and more: **For less than $10,000**

STEP OUT OF THE STONE AGE WITH RD/SHARE®

Call for more information or a 30 day trial
1-800-621-0850 Ext.418

RD Labs Inc 1986

1783 Tribute Rd, PO Box 255832, Sacramento, CA 95865

RD LABS
THE VM SPECIALISTS

THE CAMBEX 3090 ALTERNATIVE

Preserving corporate resources - it just makes good business sense. That is why many mainframe users are retaining the 308X system and upgrading main memory instead of changing to a 3090.

A few good reasons to upgrade with Cambex memory:

PRICE. RELIABILITY. DELIVERY.

Making your 308X perform at its top capacity is now easier than ever before. Our STOR/8000 Universal add-in memory gives you 8, 16 and 32MB increments at prices a full 40% lower than IBM's, yet with much higher reliability figures. Cambex boards add in just like IBM boards, with no extra space, cabinets or cooling. But unlike IBM add-in memory, the STOR/8000 is transplantable among all 308X models.

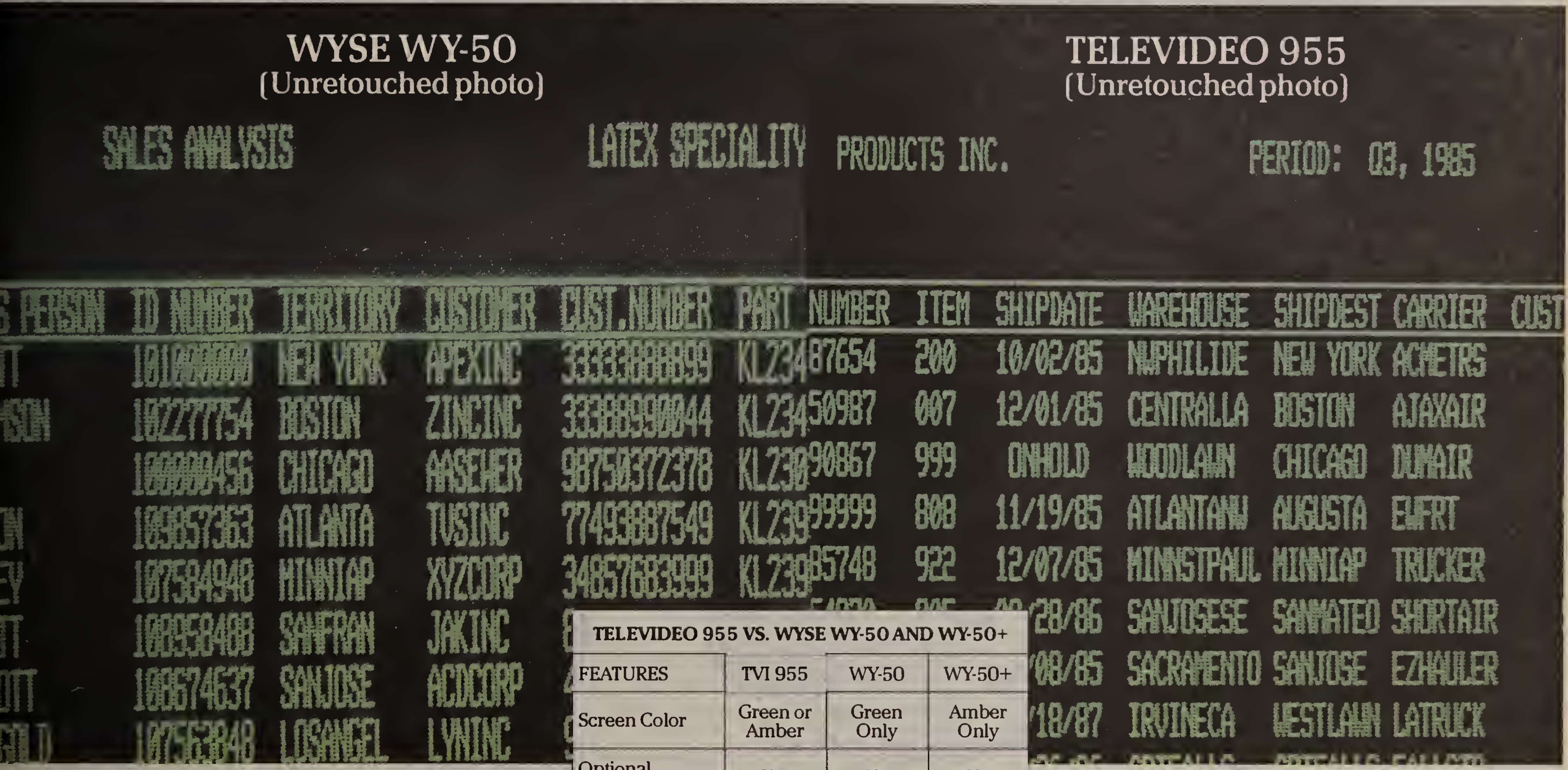
As the only independent manufacturer of add-in memory for the 308X series, for 16 years Cambex (formerly Cambridge Memories) has added memory to every model of large-scale IBM computers.

Cambex Corporation
360 Second Avenue
Waltham, MA 02154

(US) 800-325-5565
(MA) 617-890-6000
(TLX) 92-3336

Cambex - A GOOD PLACE TO PUT YOUR INFORMATION

The TeleVideo 955. Seeing is believing.



WYSE WY-50
(Unretouched photo)

TELEVIDEO 955
(Unretouched photo)

```
SALES ANALYSIS                    LATEX SPECIALITY PRODUCTS INC.                PERIOD: 03, 1985

S PERSON  ID NUMBER  TERRITORY  CUSTOMER  CUST.NUMBER  PART NUMBER ITEM  SHIPDATE  WAREHOUSE   SHIPDEST  CARRIER  CUST
T         1010000000 NEW YORK   APEXINC   33333888899  KL23487654  200   10/02/85  NWPHILIDE   NEW YORK  ACMETRS
SON       1022777754 BOSTON     ZINCINC   33388990044  KL23450987  007   12/01/85  CENTRALLA   BOSTON    AJAXAIR
          1000000456 CHICAGO    AASEHER   98750372378  KL23090867  999   ONHOLD    WOODLAWN    CHICAGO   DUMAIR
N         1098857363 ATLANTA    TUSINC    77493887549  KL23999999  808   11/19/85  ATLANTANW   AUGUSTA   EWFRT
EY        1075849488 MINNIAP    XYZCORP   34857683999  KL23985748  922   12/07/85  MINNSTPAUL  MINNIAP   TRUCKER
T         1008958488 SANFRAN    JAKINC                                      /28/86  SANJOSESE   SANMATED  SHORTAIR
OTT       1008674637 SANJOSE    ACDCORP                                     /08/85  SACRAMENTO  SANJOSE   EZHAULER
GOLD      1075638848 LOSANGEL   LYNINC                                      /18/87  IRVINECA    WESTLAWN  LATRUCK
```

TELEVIDEO 955 VS. WYSE WY-50 AND WY-50+

FEATURES	TVI 955	WY-50	WY-50+
Screen Color	Green or Amber	Green Only	Amber Only
Optional Graphics model	Yes	No	No
Dynamically allocated non-volatile function key memory	512	128	140
Maximum non-volatile bytes per function key	256	4	64
High contrast super dark Matsushita screen	Yes	No	No
List price	$629	$599	$699

Sure, most $600 terminals can scrunch 132 columns onto a 14″ screen. But you need a magnifying glass to read them.

Not so with the TeleVideo® 955. That's because we redesigned the proportion of our characters and put more space between them. And then put them on a high contrast, super dark screen. The result is the most readable 132 column ASCII display available.

But there's more to the 955 than meets the eye.

Take our tilt-and-swivel positioning, for example. The screen rotates through a full 270° right and left, and from −5° to +15° up and down. (Which makes backs and necks feel a lot better.)

Then we put all this in a machine with an incredibly small footprint, measuring just 9″ x 12.″ The result is a terminal that meets all the human factors standards recommended for adoption by the American National Standards Institute.

For more information about the TeleVideo 955, call the nearest TeleVideo regional office listed below, and we'll give you the name of your nearest distributor.

The TeleVideo 955. It's a real eye-opener.

TeleVideo®
Settle for more.

TeleVideo Systems, Inc., 1170 Morse Avenue, Sunnyvale, CA 94088-3568, (408) 745-7760, Regional Offices: Northwest (408) 745-7760, Southwest (714) 476-0244, South Central (214) 550-1060, Southeast (404) 447-1231, Midwest (312) 397-5400, East (516) 496-4777, Northeast (617) 890-3282. Amsterdam: 31.2503.35444, Paris: 33.1.4687.34.40, London: 44.9905.6464.

© 1986 TeleVideo Systems, Inc., WYSE is a trademark of Wyse Technology.

wishing to switch to N12 simply type in the code name after logging on to their "home" computer. Sometimes the computer requested is out of state, but the user need not know this — the routing is done automatically and transparently.

"We've been taking advantage of different technologies that are running on different types of processors," explains Walter Weglarz, manager of computer operations and systems at the Technical Computer and Instrumentation Center. "But from a processing standpoint, it's functioning as a single system."

That setup also allows some of Chrysler's suppliers to gain access to the computing resource, thereby submitting designs and bills to the Chrysler network directly.

> *'Some people thought the massive installation was a sandbox for us to play with. But it wasn't. We designed cars with it.'*
>
> — **Robert Brauburger Chrysler Corp.**

To integrate a single, virtual system of multiple CDC computers, key ingredients were added to the wealth of raw processing power. "The design is interactive, the response time is critical and the blocks of data we handle are very large," Brauburger says. "So we need large computer capacity, but we also need very intelligent terminals and high-capacity telecommunications."

To accomplish the latter, homegrown software projects have knit the stand-alone mainframes into a virtual network, allowing users to jump from an application on one mainframe to a second application on another. These software interfaces were built on top of CDC's LCN, a communications product similar to Network Systems Corp.'s Hyperchannel link.

The LCN is hardware independent, allowing LCN protocols to transport data from one host to another dissimilar host for further processing. Although potentially capable of running at up to 50M bit/sec., the network generally operates at a sustained throughput of 5M to 6M bit/sec.

A standard file format devised by Chrysler programmers standardizes the presentation of data so that it appears the same on-screen for each piece of computer hardware.

In addition, the company's engineers use a variety of intelligent terminals from Computervision Corp., Tektronix, Inc. and Evans & Sutherland, Inc. to relay data and ideas between dissimilar machines. Designs developed on these workstations can easily be sent to remote sites, such as Chrysler's New Process Gear plant in Syracuse, which also hosts a Cyber 180 mainframe, or to the Huntsville Electronics Division, which makes custom circuit boards for Chrysler cars using a DEC VAX-11/780 minicomputer and a Cyber 180 mainframe.

Chrysler programmers are now fine-tuning the system, adding new interfaces so that data originating in one of the Cyber mainframes can be manipulated in Sun Microsystems, Inc. or Apollo Computer, Inc. Unix-based workstations.

Finally, the whole system — all of the machines in Highland Park — had to be able to feed data into a single data base. That capability is essential to the eventual success of Chrysler's move toward computer-integrated manufacturing.

Beginning in 1981, all files and electronic blueprints were stored in a single hierarchical data base of Chrysler's own design. Now, work is under way to convert that data base into an object-oriented relational data base, but the project will not be completed for another year.

Chrysler is building on CDC's engineering data library data base management system but is adding some features that it and other automotive manufacturers require.

Finding targets for technology

The continuing challenge for the Technical Computer and Instrumentation Center managers is to identify those areas of the design and engineering function that will most benefit from inclusion in the center's network. And, while Chrysler itself has fully automated some of its factories, more progress has been made on the side of computer-aided design and engineering than on computer-aided manufacturing (CAM).

At Chrysler, as at the other major U.S. car companies, new styling is critical to sales of the next year's car models. Change for the sake of change means elements of the car will have to be redesigned from year to year. As Brauburger says, "That's where all this CAD comes in."

This fall, Chrysler is rolling out seven new models, each bearing the mark of CAD/CAM technology. Among the items typically considered for styling changes are wheel covers, mirrors, overall lines and special features. By using CAD techniques, engineers can speed this process, making changes more quickly and accurately than is possible through manual techniques, like the building of clay models.

In true CIM, each step of the manufacturing process acts as the basis for the next step, so that a single set of CAD/CAM drawings can be passed electronically to the next step via a design data base. Some say that this

Responsive to your needs.

Dorsal Environmental Seating Systems are engineered to safeguard expensive computer investments while providing user comfort ond increasing productivity.

The ingenious Dorsal "flex" allows the user to sit upright or relax without manipulating any controls or levers. And the 6° forward tilt provides back support when the user is in a work-intensive sitting posture.

Other chairs that are merely anti-static or merely comfortable are now up against one that's both, yet is surprisingly economical. Dorsal Environmental Seating meets stringent microchip and biological clean room standards.

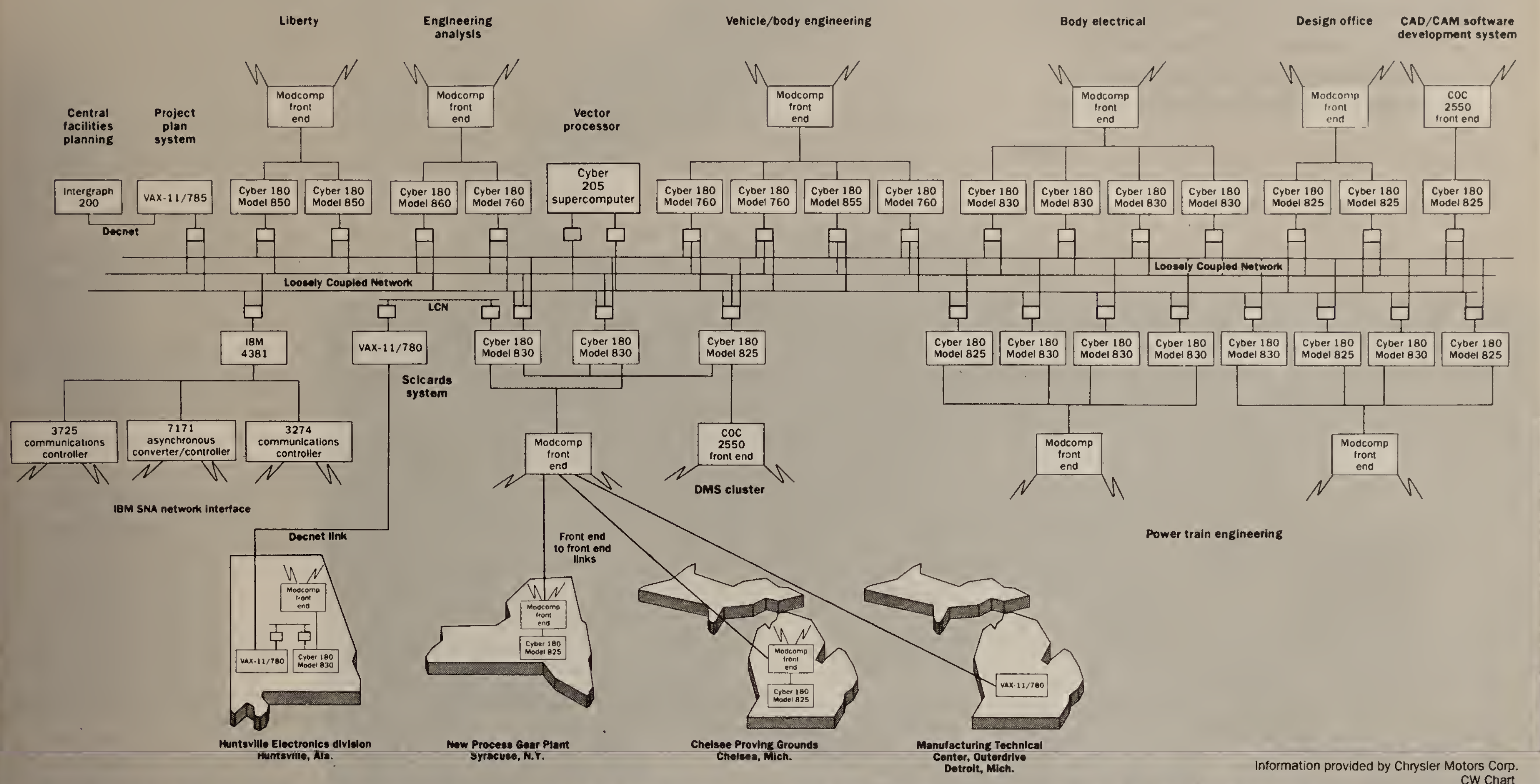
Dorsal Seating was designed by Emilio Ambasz ond Giancarlo Piretti for OPEN ArK B.V., and is produced and distributed in the U.S. under exclusive license from OPEN ArK by Krueger, Inc.

For a descriptive brochure, write to Krueger, Inc., P.O. Box 8100, Green Bay, WI 54308-8100, or call 414/468-8100

JEFF BABINEAU

Chrysler Engineering's host computer network

This simplified schematic shows the host configuration at Chrysler's Technical Computer Center in Highland Park, Mich., and remote engineering sites as of June 30. This fall, Chrysler is installing three more Cyber 180 mainframes.



Information provided by Chrysler Motors Corp.
CW Chart

Chrysler's Loosely Coupled Network is hardware independent so dissimilar CPUs can share processing. The result is a 98-MIPS virtual machine linked by fiber-optic and twisted-pair cables. The Highland Park site sends billing and reporting information to corporate MIS — an SNA environment — via an IBM 4381.

MOST COMPANIES ARE STILL LOOKING FOR A DATA TRANSFER SOLUTION. HERE ARE SOME WHO'VE FOUND IT:

- **E.F. Hutton & Company**
- **Ameritech Services, Inc.**
- **VISA U.S.A., Inc.**
- **Chrysler Corporation**
- **Wells Fargo Bank, N.A.**
- **Blue Cross of California**
- **The Mutual of Omaha Companies**
- **Atlantic Richfield Company**
- **Citibank, N.A.**
- **General Electric Company**
- **US Sprint Communications Co.**

MIS managers at well-known companies in industries from financial services to manufacturing and petroleum exploration have faced the same data transfer challenges you do. Slow throughput. Labor-intensive operation. Security problems. A growing number of companies have chosen Network DataMover® (NDM) from The Systems Center as their data transfer solution.

NDM's powerful data handling capabilities, security features and automated operations make it the leader in mainframe data transfer software. But don't take our word for it. Come to a free seminar breakfast and hear how our customers are using NDM.

To register, call 1-800-292-0104 (in Texas, 214-550-0318).

SYSTEMS CENTER
THE SYSTEMS CENTER, INC.
1320 Greenway Drive, Suite 300
Irving, TX 75038-2510
(800) 292-0104 outside Texas
(214) 550-0318 in Texas

To learn why companies like yours chose NDM, come to a free seminar breakfast:

Cleveland	Tuesday, November 4
Detroit	Wednesday, November 5
Chicago	Thursday, November 6
Dallas	Friday, November 7
St. Louis	Tuesday, November 11
Pittsburgh	Tuesday, November 11
Washington, DC	Wednesday, November 12
Minneapolis	Wednesday, November 12
Orlando	Thursday, November 13
Denver	Thursday, November 13
New York	Tuesday, November 18
Los Angeles	Thursday, November 20

> ***While Chrysler has fully automated some of its factories, more progress has been made on the side of computer-aided design and engineering than on computer-aided manufacturing.***

way, designers avoid throwing a drawing "over the wall" to engineering or manufacturing.

In CIM, a designer starts the ball rolling by drawing his concept of the car body. The engineer, the next one in line, then creates a group of specifications to match the drawing, thereby creating an electronic geometry that will stay with the car body the rest of the way to the factory floor.

This geometry can then be used in software programs to generate electronic blueprints, three-dimensional drawings, structural analyses and, finally, the numerical-control instructions that will cut metal to be used in building the car.

So far, only selected operations have been made into end-to-end CIM processes. Among them are a fabric-cutting operation for car upholstery and a wood-cutting operation for the manufacture of wooden panels on prototype car models.

The next step in Chrysler's CIM strategy will be to use the data from the solid-modeling process to control manufacturing machines on the factory floor. "We are looking at a variety of systems to achieve that level of integration," says Gregory Avesian, the center's test and development engineer. "They would need to use information from our solid-modeling techniques to create tool paths."

Chrysler will achieve this level of integration, according to Avesian, but it will take some time — perhaps two years or more. So far, only a handful of companies have achieved end-to-end CIM, and most are not as complicated an enterprise as Chrysler.

Computerized design

For now, the benefits of computerizing the design process lie mostly in the CAD and computer-aided engineering area. For example, the Cyber 205 allows a designer to summon an electronic image of a solid-looking wheel.

But the supercomputer, which takes 10 minutes, running at 50 million floating-point operations per second (MFLOPS) to 200 MFLOPS to create the image, cannot make the wheel rotate on-screen without reprocessing it — another 10-minute delay for every angle displayed.

"We want to be able to move these shapes around in real time," Avesian notes, "but the technology isn't there yet."

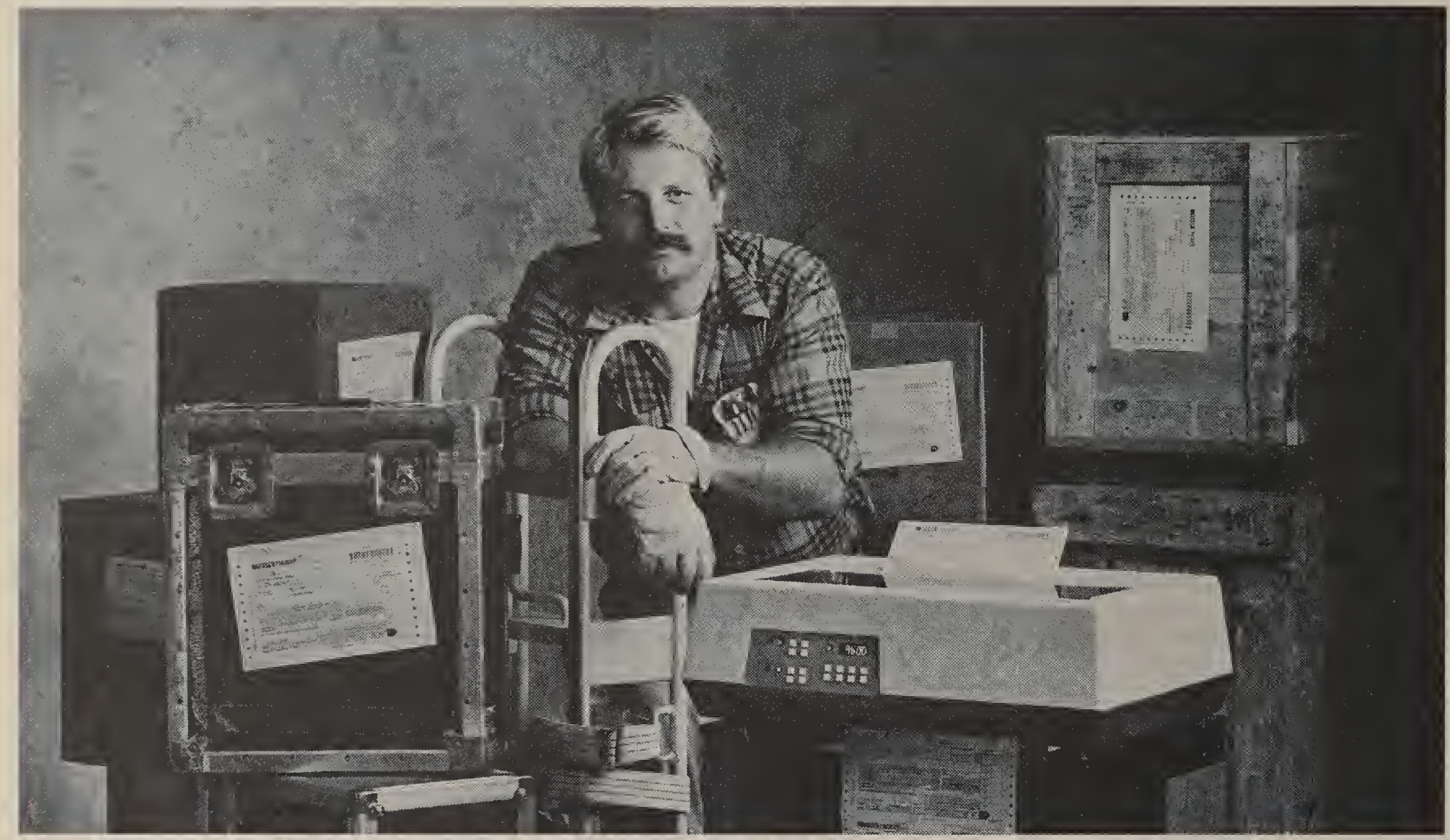
However, the supercomputer will do something else: It will calculate the wheel's mass and density and figure out how much inertia it will add to a moving car.

The power of the collection of CDC mainframes already gives the computer center's users more control than they had five years ago.

"The system allows two-thirds of the car to be designed by one-third of the people," says Glen Bibbins, the center's manager of engineering systems development. "Every day, 800 people use the system to generate realistic-looking models of a car that doesn't exist. You can show these computer prototypes to top management, and they can pick which cars they like."

The emerging factory-automation standards, Manufacturing Automation Protocol (MAP) and Technical Office Protocol (TOP), have not yet come into play in Chrysler's factories. Neither has ANSI's Initial Graphics Exchange Standard (IGES), which specifies the exchange of graphics design data bases between different CAD/CAM systems.

The reason, Brauburger says, is that Chrysler could



WORKING CLASS HEROES.

The Datasouth High Performance Matrix Printers.

Power. Toughness. Sticking to the job until the work gets done. These are some of the working-class virtues we build into Datasouth printers. Giving the DS 180 and DS 220 the proven ability to run around the clock, around the calendar, in some of the toughest applications imaginable.

That kind of blue-collar reliability is the result of a very advanced design philosophy. One that created two hard-working matrix printers perfect for your medium-speed printing requirements, from 180 to 220 cps. Ready to take on multipart forms of up to 6 layers. Or produce Near Letter Quality text at 45 cps for word-processing applications. And although they're tough, Datasouth printers are easy to use, with front panel controls instead of dipswitches and jumpers.

Each and every DS 180 and DS 220 printer that comes out of our Charlotte, North Carolina plant has been put together and inspected by hard-working people who take a lot of pride in building the world's toughest printer right here.

Put a working-class printer to work for you. To find your nearest Datasouth distributor, call us at 1-800-222-4528.

Datasouth
AMERICA'S HIGH PERFORMANCE PRINTER COMPANY

P.O. Box 240947, Charlotte, N.C 28224, (704) 523-8500, Tlx: 6843018, DASO UW SALES: 1-800-222-4528, SERVICE: 1-800-438-5050, West Coast Office: (818) 702-9065

YOU CAN'T DEVELOP THE WORLD'S BEST SOFTWARE ON THIS.

Fifteen years ago, the typical business software vendor worked with an R&D budget that could just about lace up his sneakers.

That's because the head of R&D was also the president, the sales manager and the night watchman. And his office was in the eaves over his garage.

Those were the frontier days of the software industry, when you had umpteen hundred vendors vying for a place in the sun.

And every one of them was a one-package startup setting forth with a disk and a prayer.

Of those umpteen hundred, very few have stood the test of time. As one who has, we can tell you that shoestring budgets and single-package technology may have gotten us started. But they aren't what made us grow into the McCormack & Dodge of today. A global company offering a broad, integrated constellation of products.

The borderless technology that links our multiple packages was not created out of thin air. It took teams of well-paid talent. It took money.

As a Dun & Bradstreet company, we can count on having the financial resources for true R&D. The kind that lets us develop products for the distant future, not just for the short-term market.

So when you go looking for today's leading edge software, remember we're already working on tomorrow's.

McCormack & Dodge

a company of
The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760, 1-800-343-0325

So the MIS executive asked, "How do I get departmental systems that keep everyone happy? Including me."

And we said, "That's our department."

With Honeywell's ONE (Office Network Exchange) PLUS Departmental Systems, computer pros and department heads together can make fully integrated departmental computing a reality. And at the same time protect their present investment in WANG and IBM systems – by tying them together through ONE PLUS's communications capabilities. ONE PLUS also supports IBM's SNA. Honeywell's ISO-based DSA. Ethernet. MAP and TOP protocols. DMI interfaces to AT&T PBX's.

Much more than communications, ONE PLUS provides business applications like office and data processing. Transaction Processing. Business Graphics. Electronic Mail. Document Translation. Plus access to islands of computing through data base tools such as ORACLE®* and ONEbase.

Through ONE PLUS's unique document translator, all your systems can share information in their native format: Users can create, revise and transfer files among IBM and compatible PC's using Multimate, Wordstar and Displaywrite; WANG OIS and VS systems; and Honeywell.

The heart of ONE PLUS is Honeywell's new DPS 6 PLUS family of 32-bit virtual memory superminis. With shadow processing and tightly coupled multiprocessor architecture, these systems are more than a match for IBM's System 36, WANG's VS, Data General's Eclipse MV, and Digital's VAX.

For more information, call 1-800-328-5111, ext. 9712 or write Honeywell Information Systems, MS440, 200 Smith Street, Waltham, MA 02154.

Together, we can find the answers.

Honeywell

*Oracle is a registered trademark of Oracle Corporation, Menlo Park, CA.

not afford to wait until these standards became finalized. For example, IGES Version 2.0, completed in 1983, works only with two-dimensional designs; Chrysler software already works in three dimensions.

So in some cases, Chrysler software engineers have had to reinvent the wheel, even if that wheel has to be somewhat modified later on.

After building up the computer resources, the center's managers decided to apply it to those areas that would experience the greatest productivity gains. Drafting is a good example. Hand-drafting designs takes about 70 times as long as generating the designs on-screen, Avesian and others estimate.

In addition, the ability to use the same electronic geometry throughout the design and engineering process has sharply curtailed errors. In the manual process, drafters often introduce errors when transferring their drawings from one blueprint to another. Eventually, the hope is that the identical geometries can be used to calculate numerical-control instructions for directing the drilling, welding and robotic machines in the robotic plants.

One of the most enthusiastic responses to new technology comes from Cyber 205 users working with Synthavision, a design software package developed by Mathematical Applications Group, Inc. in Elmsford, N.Y., and leased through one of CDC's third-party suppliers.

Synthavision's solid-modeling module allows the Cyber 205 to generate electronic renderings of the surface of a car or component based on its internal geometry.

Synthavision gives designers their first glimpse of the finished product, down to the color of the paint and upholstery. Designers have hundreds of colors — and any shade variation of those colors — from which to choose, although they can use only four at any one time.

The colors are chosen from a color palette that is displayed on-screen. The designers also use the Cyber 205 to visualize parts, such as gears or wheel covers, rotating these images as they would move during the vehicle's operation to spot any possible interference or rubbing.

> ❞
>
> *'The system allows two-thirds of the car to be designed by one-third of the people.'*
>
> — Glen Bibbins
> Chrysler Motors

The addition of new imaging techniques will allow the Cyber 205 to put high-quality, convincingly realistic images on screen.

These images, Avesian says, "will be viewed by upper level management prior to our building full-size theme models."

Right now, software engineers are refining their imaging techniques even further for executive presentations. Someday they may be able to include reflections from shiny surfaces on top of and underneath the car to produce a picture close in quality to a photographic image.

Doing more with less

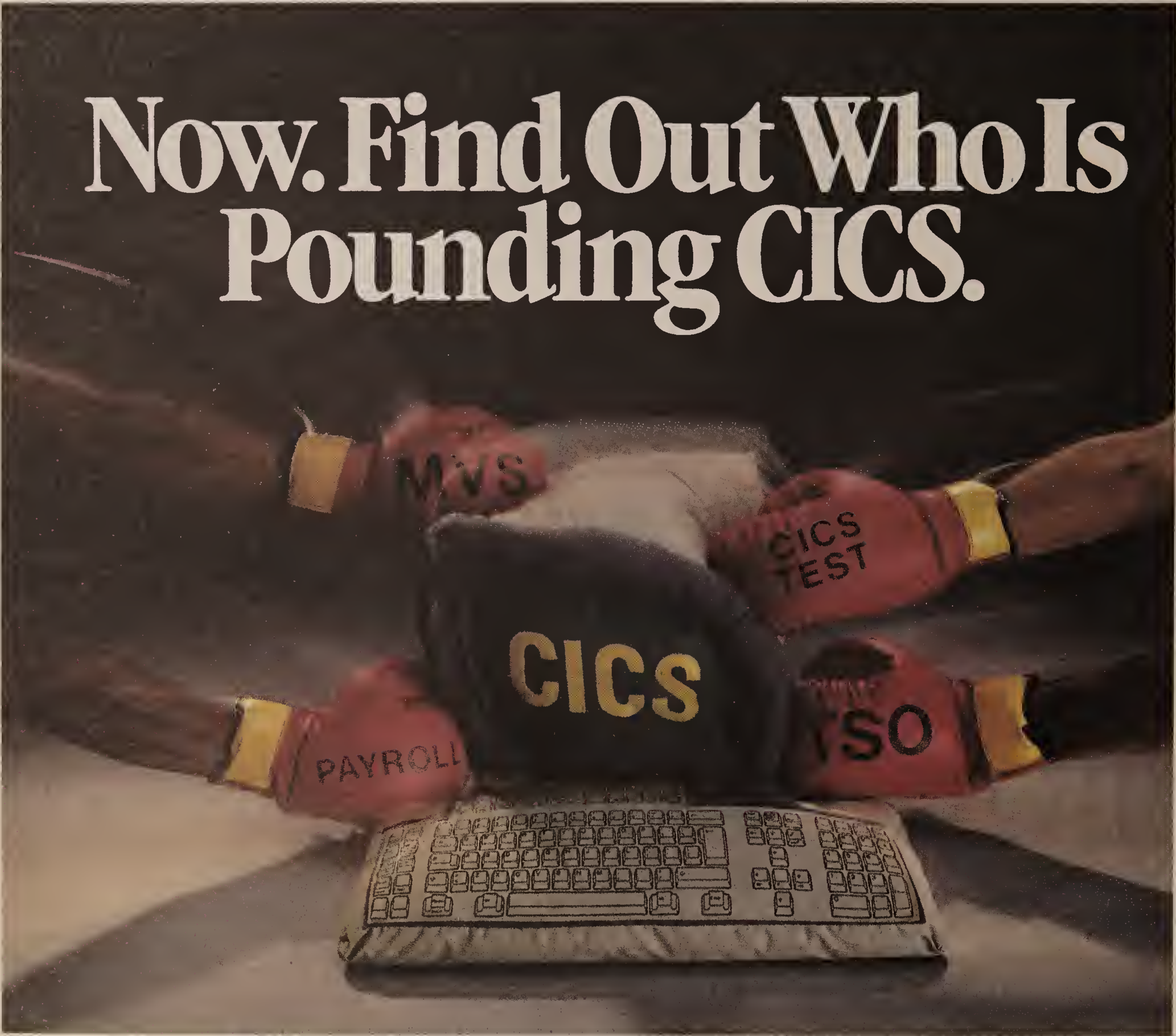
After the designers are finished, the engineering process begins. Chrysler has developed in-house several key pieces of CAD/CAM software for engineering.

Among them are Quickcon and Concept for three-dimensional wire-frame modeling and GCSNast for pre- and postprocessing of Nastran applications.

Nastran, an industry-standard package developed by the National Aeronautics and Space Administration, enables the Cyber 205 to conduct extensive structure analysis through finite-element analysis.

Chrysler's GCSNast package prepares both the input and output files that are used by the Nastran software.

Avesian estimates that Chrysler engineers now spend 1,500 man-hours each week generating computerized surface images based on electronic blueprints. The 3-1 ratio of productivity gains



Now. Find Out Who Is Pounding CICS.

It's the last round. CICS response is down for the count. How do you find out who is throwing the punches? With a powerful name technology from Candle Corporation called Impact Analysis.

An Impact Profile clearly shows the impact on CICS.

This exciting breakthrough in OMEGAMON/CICS tells you how much PAYROLL, TSO, JES2, or even other CICS regions are impacting CICS performance. OMEGAMON *clearly* shows the *precise* impact of other jobs on CICS, as well as the impact of CICS on itself. OMEGAMON also introduces easy-to-use Recommendation Menus with valuable information about preventing and solving most CICS performance problems. Of course, you also get support for IBM's latest CICS release, 1.7.

All this and much more is available with Candle's newest version of its fully integrated family of CICS performance management products. They provide the breadth *and* depth you need—either as quick overviews or as detailed information about system performance. For more information, just call Terry Forbes toll free at **(800) 843-3970.**

Don't let CICS by KO'd. Now you can get the information you need to help keep CICS from being pounded out of shape...and to keep your users from feeling the impact.

!Candle®

Candle Corporation
1999 Bundy Drive, Los Angeles, CA 90025
Copyright © 1986 Candle Corporation. All rights reserved.

for this type of work was strictly planned.

That kind of qualitative change in Chrysler's car development is what Brauburger and his staff were after when they built up their computing resources in the early 1980s.

But even as the number of computers was growing, the number of people required to run the computer operation was shrinking. Brauburger says, "We're doing more with less."

In fact, just five console operators per 24-hour period are needed to tend the 27 Cyber 180 mainframes. Since they do not have to contend with batch jobs, these operators spend their time keeping the systems up and running to support interactive transactions.

Chrysler managers felt that they had surely broken new ground when they created the massive orchestration of computer hardware and software that is the Technical Computer and Instrumentation Center. The company, quite simply, was facing questions that had not been answered yet in the automobile industry.

The engineers say they must use their past experience with computer systems to guide them."There are no rules to this," Brauburger says. "We use our intuition and knowledge, and one of the secrets to our success has been guessing right."

The pursuit of CIM

Chairman Iacocca repeatedly stresses the company's commitment to state-of-the-art technology in keeping the company competitive. As early as 1962, Chrysler began to use the first CAD data bases.

From the beginning of the Technical Computer and Instrumentation Center, which is nearly 20 years old, Chrysler has chosen to view data as a valuable commodity.

Still, managers are intently pursuing the application of CIM techniques to the manufacture of Chrysler's future car lines. This fall, three more Cyber 180 mainframes are being installed at the center.

Project Liberty

Two of these computers will be devoted to Project Liberty, a Chrysler plan to develop CIM computer programs that will build future car lines using a single data base of engineering elements from design to finished product.

If all goes as planned for the next few years, Chrysler will move part of its technical computer complex to Auburn Hills, Mich., about 30 miles north of Highland Park. There, in the 500-acre Liberty Center complex, Chrysler engineers and designers will devise CAD/CAM solutions and CIM programs for future car lines.

Project Liberty will be the psychological equivalent of GM's Saturn project, Chrysler engineers say. It will provide a think tank in which Chrysler engineers can maintain a position on the leading edge of technology while forging better links between design systems and manufacturing systems.

Right now, this leap forward is being held back by some very down-to-earth political considerations, such as questions raised by local zoning authorities.

But when it is built, the Liberty Center will be the point from which Chrysler launches its plans for the 21st century.

Chrysler has already made great strides in automating its plants. In 1983, at a cost of $400 million, it revamped the Windsor, Ont., plant that produced its New Yorker sedans to become the first factory to produce the now-popular Plymouth Voyager and Dodge Caravan minivans.

There, dozens of robots do the spot welding, sending sparks flying without human intervention. But the robots are controlled by programs within the factory, not by programs automatically generated from the original electronic renderings of the car.

More work to do

By its own accounts, Chrysler is the most automated U.S. car company, with highly automated factories like the "Dodge City" plant in Warren, Mich., that makes Dodge trucks and the Sterling Heights, Mich., plant that makes Chrysler LeBarons, Dodge Lancers, Dodge Shadows and Plymouth Sundances. And yet, Chrysler has more work to do to achieve total CIM.

The goal of corporate computer planners like Brauburger is to be able to spread CIM throughout the company — letting the original designs flow through the entire system. "The car is a complex beast," he says. "And not all portions of the company are embracing the technology at the same time."

But Brauburger is quick to say that Chrysler does not have the so-called islands of automation that typically plague companies developing computer-integrated manufacturing systems. "We don't move in lockstep like a phalanx," he says, "but we don't have islands of automation. We have levels of enthusiasm." ■

”

> *'We don't move in lockstep like a phalanx, but we don't have islands of automation. We have levels of enthusiasm.'*
>
> — Robert Brauburger
> Chrysler Motors

Who lets you generate, test, and run CICS applications on a PC today?

Computer Corporation of America.

CCA's new release of Accolade is the only applications generator that lets you develop, generate, test, and run command level COBOL applications on both the mainframe and the PC. Not only in MVS, but in DOS/VSE. And it's available now.

With Accolade, you can even run distributed applications on either the mainframe or a PC. No other applications generator can offer you that.

Accolade's applications are much more structured, too. You get tightly designed code that executes very efficiently. In fact the average Accolade program requires 2 to 4 times less memory than other generated CICS applications. It's the result of a simple, specifications-driven generation process. And it means that your programmers will be able to generate programs up to 15 times faster than normal.

Accolade is the first applications development system to offer this highly productive combination of tight structure and transportability. Its facilities are complete and identical under CICS and PC-DOS with applications transportable between them at specification and source code levels.

Accolade provides direct access via supported interfaces to VSAM, Model 204, DL/1, and DB2. Any DBMS or file manager may be accessed from Accolade programs.

Find out more about this rich productivity tool from CCA. Send us the coupon or call John Donnelly at 1-800-258-4100, ext. 705.

DB2 is a registered trademark of International Business Machines Corporation.

Please send me the complete story on Accolade.
Mail to: Four Cambridge Center, Cambridge, MA 02142.
Name ____________________
Company ____________________
Title ____________ Telephone ____________
Address ____________________
City ____________ State ____________ Zip ______
Computer Corporation of America
A Crowntek Company
CW

New Dimensions in Software Productivity.

WHEN WE LOOK AT IBM YOUR CUSTOMERS WILL BE LOOKING FOR YOU

Issue: December 3 • Closing: October 24

Our December 3 *Computerworld Extra* will report that times have changed when it comes to dealing with IBM. End users are taking a more active role in determining what's best for them. In "Managing IBM," our second annual look at IBM, we'll present case histories showing how leading users have gotten — and continue to get — the most from their IBM and compatible equipment.

Experts like E.F. Codd, the "father" of relational systems, William F. Zachmann of International Data Corporation, and CICS authority Steve Piggot will analyze IBM products and strategies. All with a focus on what users need to know in order to get the most out of today's systems. Then we'll take a close look at the managerial aspects of dealing with IBM. How to negotiate discounts and service agreements, for starters.

You'll get the story — and the audience. More than 128,000 *Computerworld* subscribers will get this issue. And with a focus on IBM, a great many more will read it as it's passed to and from offices throughout individual companies. Plus, all these readers will be able to get more information on your company by way of a Reader Service Card contained in each copy.

So if you've got a product or service that's IBM compatible (or an alternative), this special issue will give you a tailor-made audience. But hurry, because our closing date is October 24 — and space in last year's *Computerworld Extra* on IBM went fast.

To reserve your space, call Ed Marecki, Vice President/Sales at (617) 879-0700. Or call your local *Computerworld* sales representative.

COMPUTERWORLD
EXTRA

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700
NEW YORK: Paramus Plaza I, 140 Route 17 North, Suite 312, Paramus, NJ 07652 (201) 967-1350
ATLANTA: 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758
CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433
DALLAS: 300 Broadway, Suite 20, San Francisco, CA 94133 (214) 991-8366
SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330
LOS ANGELES: 18004 Sky Park Circle, Suite 255, Irvine, CA 92714 (714)261-1230

A PUBLICATION OF CW COMMUNICATIONS

MANAGEMENT

TAKING CHARGE
Mark M. Klein

Angst of the BUNCH user

BUNCH is an amusing acronym for the companies that were once IBM's chief competitors in the mainframe computer business — Burroughs Corp., Univac Corp. (now Sperry Corp.), NCR Corp., Control Data Corp. and Honeywell, Inc. .

At one time, the group numbered seven — "the seven dwarfs" — and included General Electric Co. and RCA Corp., which have left the commercial computer business. Now the count is down to four, with Burroughs' acquisition of Sperry, and may drop to three with an exit by Honeywell.

Corporate management of companies that use computers made by the BUNCH is certainly aware that IBM has become the dominant supplier and that its rivals have had financial difficulties in recent years. These firms are concerned that their supplier might leave the business or fail to supply the technology they need to be competitive.

In most cases, companies with BUNCH computers selected their vendors prior to the mid-1970s for what were then very good reasons. Even today, each of the BUNCH has special strengths in certain markets: Burroughs in banking, Sperry in government, NCR in retailing, CDC in science and engineering and Honeywell in manufacturing.

But management in BUNCH user companies now has three primary questions, which are:

- "What is the likelihood that my

See **ANGST** page 94

Klein is vice-president of John Diebold & Associates, a division of The Diebold Group, Inc. of New York.

Corporations scan videotex

Business demand doubles despite slow home market

By David A. Ludlum

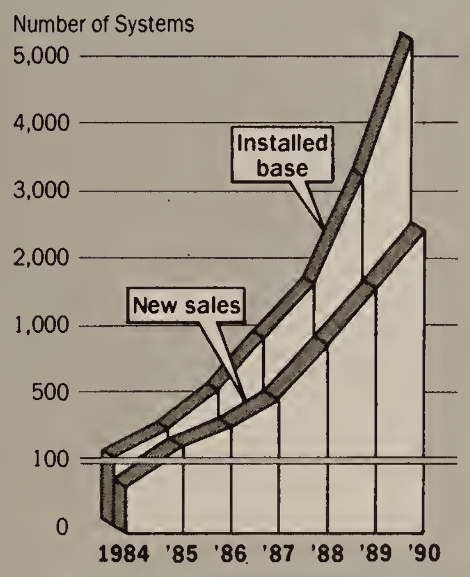
Videotex, nearly moribund as a consumer service compared with the glowing forecasts of recent years, is catching on as a corporate communications tool.

At $88 million, the market for consumer videotex systems in North America this year should be twice the size of the corporate market, according to Link Resources, Inc. of New York. The firm projects, however, that by 1990 the corporate market will far outstrip the home market, climbing to $396 million, while the home market reaches only $169 million.

David Baker

The market for corporate videotex systems in North America has grown from $18 million in 1984 to an estimated $44 million this year, according to Link Resources. It expects to see 509 videotex systems installed in North American corporations by the end of 1986, more than double the number from a year earlier, and more than 5,500 systems in place by 1990.

Corporate videotex
Projected growth in unit sales of corporate videotex systems in North America



Information provided by a 1986 Link Resources Corp. study

JEFF BABINEAU

"I think the corporate market is where the action is in videotex," says David Baker, manager of office automation systems for United Telephone Co. of Florida. "Our business environment is becoming increasingly complex. We have more information to manage than ever before, the timeliness of that information is becoming increasingly important and videotex is a solution."

Corporations are using videotex — a two-way, interactive text-and-graphics communications system accessed through personal computers or terminals — to move information to audiences that include suppliers, distributors and customers as well as their own executives and other employees.

A look at three corporate videotex users depicts the variety of functions the systems perform and highlights some of the management considerations involved.

United Telephone of Florida is aiming its Infonet videotex systems at providing top executives with fresh, easily accessible information and reducing costs of widely distributed paper reports, Baker says. The company chose Digital Equipment Corp. VTX videotex software when it found the software would operate on the VAX running its All-In-1 office automation system, Baker says. The two integrate "very nicely," he notes.

Information can be moved easily to the DEC videotex system from both decision support programs on All-In-1 and, using a Systems Network Architecture gateway, from an IBM 3090 used for data processing, according to Baker.

While videotex lowers costs by reducing use of paper, its real benefit lies in making fresh information easily available to top decision makers, Baker says. "Nobody has to sit there and play with spreadsheets," he claims.

Baker singled out the videotex system's ability to convert, with no human intervention, raw data entered by clerks in remote offices to reports for vice-presidents

See **CORPORATIONS** page 90

INSIDE

Survey says DP managers' salaries on rise/**90**

Calendar: Selected conferences, exhibitions, seminars/**92**

INSTANT ANALYSIS

"It's a lot cheaper to use a lot of little computers than one big one, just as it's cheaper to use 10 horses than to cultivate one very large one."

— Michael Dertouzos, professor of computer science and electrical engineering, MIT

Technology Slightly Ahead of its Time.

Successful corporations grab large market share because they use existing technologies in effectively novel ways. They make life easier and better for their customers. They understand how DP technologies can be used to increase productivity and bolster returns on investment.

And they all have one thing in common: **Fast-moving corporations make sure their people are EDUCATED and INFORMED.** Educated by some of the greatest minds in the DP field; people who have not only invented the technologies about which they lecture, but who have also helped major corporations with implementation.

At Technology Transfer Institute, we provide you with the people, the tools, and the techniques to answer your company's most pressing and profit-related questions.

Staying ahead of the competition isn't easy. It's our business to see that you do. See for yourself at one of our "enlightening" seminars.

Give us a call for more information or registration. Find out why your competitors are using education.

Technology Transfer Institute
Computer Seminars of Excellence
741 Tenth Street
Santa Monica, CA 90402-2899
(213) 394-8305

Corporations scan videotex

From page 89

on a key statistic known as the exchange maintenance index.

He concedes that such value is hard to quantify but says he has found traditional cost-justification methods "wholly inadequate for office automation systems."

Using a conventional data base system to generate the same information would involve a longer response time and require 10 times as much computing power, he adds.

At General Motors Corp.'s Buick Motor Division, videotex provides data on products to dealers, who can use it to answer customer questions, and to potential customers directly through public access terminals, of which there are now four.

Buick's Electronic Product Information Center provides information such as locations of cars with certain features, the costs of a car given specific options or financing programs and the status of orders.

Buick developed the system jointly with IBM and Electronic Data Systems Corp. Dealers use IBM Personal Computer ATs that contain a local data base and a modem for retrieving updates, which are distributed two to three times a week via a VAX 11/780. At $9,900, including a printer and cabinet, Buick has sold systems to 418 of its roughly 3,000 dealers since May 1985.

Buick's Newell

The division expects to have 600 systems sold by Sept. 1987, says Nancy Newell, senior coordinator for Marketing Through Technology. "It makes salesman's presentation very credible. It provides a competitive edge for showroom selling," Newell says. Buick's system also "gets rid of all that hard copy," she notes.

American Airlines has launched Eaasy Sabre, a videotex system that extends the reach of its highly profitable Sabre system, which is used by travel agents to make reservations and retrieve information on flights, hotels, rental cars and other travel services.

Eaasy Sabre lets personal computer users dial up information and book flights and other services through several public networks. They include Dialcom, a business service owned by British Telecommunications PLC; General Electric Information Services Co.'s business network and Genie consumer service; and Quantum Computer Corp.'s Quantum Link service for Commodore users. American is discussing use of other networks, said Helen Bradley, Eaasy Sabre project manager.

Eaasy Sabre provides access to four Sabre IBM mainframes front-ended by a group of VAXs that translate Sabre's protocol into ASCII characters to be sent over the CCITT X.25 packet-switched networks, according to Bradley."VAX had a product to interface with X.25 and IBM didn't," she says, explaining the choice of equipment.

Bradley would not disclose how profitable Eaasy Sabre is but says the airline is "very encouraged." She declined comment on its costs except to say they were incremental and largely for translating the Sabre protocol into "plain English."

American launched Eaasy Sabre after extensive study, Bradley says. "We had done a great deal of research and were confident that the time was right. We analyzed our target market and saw there were enough people out there."

DEC is the leading vendor of inhouse videotex systems, with installations numbering about 300 and "growing appreciably," according to Joshua Harris, senior analyst with Link Resources' videotex planning service.

Most of DEC's systems are at Fortune 500 companies and are sold through sales, marketing or other departments rather than MIS shops, Harris says. DEC generates a large share of its videotex revenue through consulting, he adds.

DEC's success stems in part from videotex's fit with its overall product line, both in terms of function and connectivity, Harris says. "DEC is the biggest success story in this particular area," he says.

DP managers' pay rises 7.4%

Salaries of data processing operations managers at large installations have risen more than twice as much as those of the average DP operations manager this year, growing to more than$50,000, a recent survey shows.

Salaries of operations managers at the largest one-third of DP shops rose 7.4% to $50,640, according to the Association for Computer Operations Managers (AFCOM). That compares with increases of 3.4% overall for the position. The largest one-third of all installations have budgets of more than $3 million.

The AFCOM survey generated responses from 375 companies, universities and other organizations, according to Len Eckhaus, AFCOM's president, who said he is surprised at the movement of salaries for DP operations managers above $50,000. Most of the companies surveyed are Fortune 1,000 firms, he added.

$$\begin{array}{r}1\\+1\\\hline 3\end{array}$$

GUESS WHAT HAPPENS WHEN YOU COMBINE THE STRENGTHS OF NYNEX AND SUNY COLLEGE OF TECHNOLOGY.

Partnerships have a way of producing results that defy the principles of basic math. Like the partnership we formed with SUNY College of Technology.

The challenge here was tying their computers together. They also needed a customized communications network to integrate their diverse information technologies – equipment from Gould, DEC and IBM, to name a few. A network that would give students, faculty and administrators access to any kind of information from any location on campus. Without needless delays.

The solution was the creation of a powerful communications and information system, using the latest in LAN technology, based upon InteCom's IBX S/10 switch. The network integrated SUNY's existing technologies and, with the addition of Data General's ECLIPSE MV/10,000 computer and CEO software, significantly expanded the system's capabilities.

And we did it all. From designing the system to installing it; to thoroughly training everyone to use it.

But our partnership with SUNY College of Technology didn't stop there. We also teamed up to create the Telecommunications Institute. Which not only offers a Bachelor's Degree program, but serves as a "living laboratory" for research and development in telecommunications technology as well.

What does all this academic achievement mean to your business? It means if you're looking for a partner to help you build your business information system, no matter how sophisticated it has to be, call NYNEX.

Because time and time again, our experience has shown that the whole is greater than the sum of its parts.

1-800-346-9X9X

NYNEX

Business Information Systems

PUT YOUR SPECIFICATIONS TO WORK. INSTEAD OF ON THE SHELF.

Let PACBASE™ automate them for full life cycle system productivity.

You've spent a fortune in time, effort and money to compile a vast library of specifications. They contain valuable information that should be usable again and again.

They gather dust on a shelf, as demand for new projects mounts and productivity flounders.

Now you can change all that, dramatically. With the full life cycle software system that automates the management and control of your specifications: PACBASE.

PACBASE generates complete systems.

With an active specifications dictionary driving the process, PACBASE generates complete production systems directly from your specifications.

PACBASE automatically builds 100% of the system. Batch and on-line COBOL programs. Screen maps. Database descriptions and access for IMS*, DB2* or IDMS**. On-line help. End-user manuals. The works.

PACBASE saves time and effort.

PACBASE stores your specifications for reuse in new projects, greatly enhancing development productivity. Systems are standardized, reliable, consistent and easier to test and maintain.

All specifications are cross-referenced and keyword searchable, so impact studies can be run in a fraction of the time. Suggest a change. Then analyze its impact on related programs, screens, reports, documentation and help screens within minutes.

You'll never have to maintain a COBOL program again. Just modify the specifications, then let PACBASE regenerate the updated program, documentation and on-line help. Programs remain organized, efficient and documented, no matter the amount or frequency of maintenance.

And PACBASE increases the productivity of your entire project team, not just programmers.

All work from a central information source, the specifications dictionary. That reduces effort, because work needs to be done only once. It improves communication between team members, too.

Let us tell you more.

Nearly 500 installations around the world have benefited from PACBASE, a 1985 winner of the $50 million ICP Award.

You too can profit from the long-term system productivity PACBASE offers. For more on getting your specifications off the shelf and on the job, return the coupon below. Or call CGI Systems, Inc. collect (914) 735-5030. (In Canada, call SIRC Software at (514) 878-1170.)

cgi

CGI Systems, Inc.
One Blue Hill Plaza, P.O. Box 1645
Pearl River, NY 10965

I want to put my specifications to work:

☐ I have an immediate need
☐ Please send more information

Name______________________________

Title______________________________

Company______________________________

Street______________________________

City____________________ State______ Zip______

Telephone (______)________________________

Return to CGI Systems, Inc. at the above address.

CW1020

*IMS, DB2 are registered trademarks of IBM Corporation
**IDMS is a registered trademark of Cullinet Software, Inc.

CALENDAR

OCT. 26-NOV. 1

Digital Document Automation: The Emerging User. Reston, Va., Oct. 26-28 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

American Trucking Association Fall Workshop and Systems Demonstrations. New Orleans, Oct. 26-29 — Contact: ATA Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

International Data Corp.'s MIS Executive Conference. Palm Springs, Calif., Oct. 26-29 — Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

Fifth World Congress on Medical Informatics. Washington, D.C., Oct. 26-30 — Contact: George Washington University Medical Center, Office of Continuing Medical Education, 2300 K St. N.W., Washington, D.C. 20037.

The State of the Art in Computer Capacity Management. Tarrytown, N.Y., Oct. 27 — Contact: International Systems Services Corp., 41st Floor, Two Grand Central Tower, 140 E. 45th St., New York, N.Y. 10164.

Annual Teleconferencing Users Conference. Anaheim, Calif., Oct. 27-29 — Contact: Applied Business Telecommunications, Box 5106, San Ramon, Calif. 94583.

Data Processing Management Association Annual Computer Conference and Business Exposition. Atlanta, Oct. 27-29 — Contact: Conference and Meetings Manager, DPMA International, 505 Busse Highway, Park Ridge, Ill. 60068.

Hammer Forum 86. Cambridge, Mass., Oct. 27-29 — Contact: Hammer and Co., Five Cambridge Center, Cambridge, Mass. 02142.

Optimizing Software Productivity and Quality. Arlington, Va., Oct. 27-29 — Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402

National Database and 4th Generation Language Symposium. Dallas, Oct. 27-30 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Satech '86. Boston, Oct. 27-31 — Contact: No. 34, 2472 Eastman Ave., Ventura, Calif. 93003.

Token-Ring Vendor Forum. San Jose, Calif., Oct. 29 — Contact: Network Strategies Group, 1435 Koll Circle, San Jose, Calif. 95112.

Distribution Computer Expo '86 East. Parsippany, N.J., Oct. 29-30 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

Applications of Artificial Intelligence and Expert Systems. Arlington, Va., Oct. 29-31 — Contact: Learning Technology Institute, 50 Culpeper St., Warrenton, Va. 22186.

Association of Public Data Users 11th Annual Conference. Washington, D.C., Oct. 29-31 — Contact: Susan Anderson, APDU, 87 Prospect Ave., Princeton, N.J. 08544.

2nd Annual Pansophic Users Learning & Sharing Exchange (PULSE). King of Prussia, Pa., Oct. 30 — Contact: Susan Masterson, Regional Administrator, Pansophic Systems, Inc., Suite 103, 485 Devon Park Drive, Wayne, Pa. 19087.

Telecommunications and the Computer Connection. White Plains, N.Y., Oct. 30-31 — Contact: Pace University, Bedford Road, Pleasantville, N.Y. 10570.

Computer Dealers and Lessors Association Annual Meeting. Colorado Springs, Colo., Oct. 30 to Nov. 1 — Contact: CDLA, 1212 Potomac St. N.W., Washington, D.C. 20007.

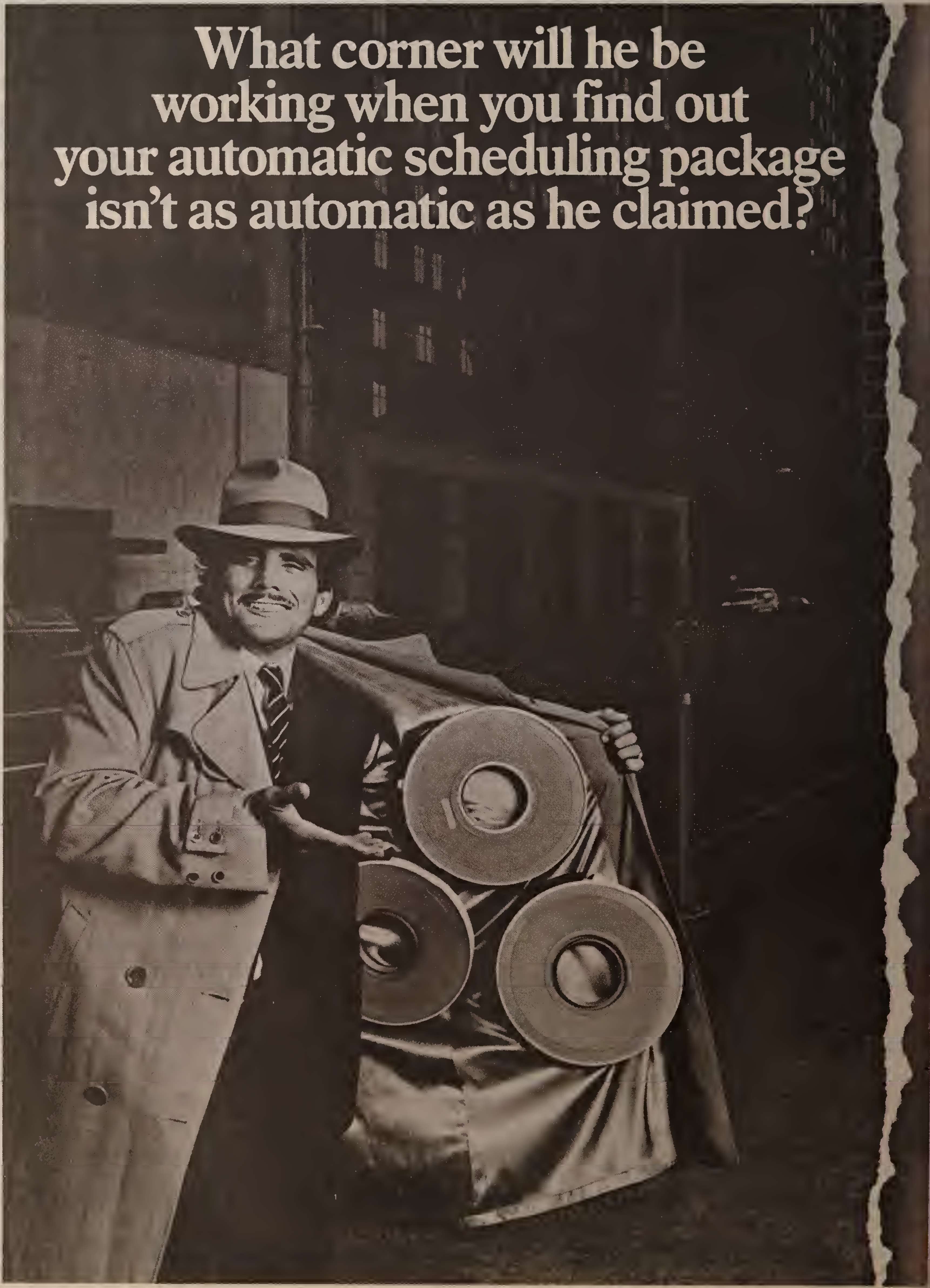
The End-User Revolution. San Francisco, Oct. 31 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

UCSD Pascal Users Society Biannual Meeting. Greenwich, Conn., Nov. 1-3 — Contact: Software Systems, Inc., 1410 39th St., Brooklyn, N.Y. 11218.

ORACLE® REPORT WRITING

SQR™, a new report writer for the Oracle database, combines the simplicity of SQL with structured procedural controls to create a report writing language of unsurpassed power and speed Features include DML capabilities, in-memory table processing, and a document mode for full screen report layout. Versions now for VAX/VMS, DG-MV/AOS, IBM-PC VM coming soon. Contact SQ Software, P O Box 21171, Cleveland, Ohio 44121. (216) 397-0551

Oracle is a registered trademark of Oracle Corporation


What corner will he be working when you find out your automatic scheduling package isn't as automatic as he claimed?

NOVEMBER 2-8

ADAPSO 65th Management Conference. Phoenix, Nov. 2-5 — Contact: ADAPSO Education Dept., Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

1986 NAWGA Computer Conference and Expo. Atlanta, Nov. 2-5 — Contact: National-American Wholesale Grocers' Association, 201 Park Washington Court, Falls Church, Va. 22046.

Fall Joint Computer Conference '86. Dallas, Nov. 2-6 — Contact: Stanley Winkler, FJCC '86, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Managing the Information Resource. Los Angeles, Nov. 2-7 — Contact: Office of Executive Education, Graduate School of Management, University of California, Los Angeles, Calif. 90024.

Disoss Implementation. Washington, D.C., Nov. 3-4 — Contact: The Georgetown Group, Inc., Moore-McCandlish House, 3950 Chain Bridge Road, Fairfax City, Va. 22030. Also being held Nov. 5-6 in Washington, D.C. and Dec. 8-9 and 10-11 in New York.

Automated Manufacturing Exhibition and Conference. Greenville, S.C., Nov. 3-6 — Contact: Allen F. Barney, AM86, P.O. Box 5616, Greenville, S.C. 29606.

Electronic Imaging '86. Boston, Nov. 3-6 — Contact: MG Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

Long Range Information Systems Planning. Washington, D.C., Nov. 3-6 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Advancing Standards Technology for Distributed Information and Telecommunications Systems. Boston, Nov. 3-7 — Contact: Omnicom, Inc., Suite 304, 501 Church St. N.E., Vienna, Va. 22180. Also being held Dec. 15-19 in Denver.

Corporate Electronic Publishing. Saddlebrook, N.J., Nov. 4 — Contact: Texet Corporation, 37 Broadway, Arlington, Mass., 02174. Also being held Nov. 5 in Atlanta, Nov. 6 in Chicago and Nov. 7 in Seattle.

North American Telecommunications Association Convention & Exhibition Showcase. St. Louis, Nov. 5-7 — Contact: NATA, Suite 550, 2000 M St. N.W., Washington, D.C. 20036.

Scientific Computing & Automation Conference and Exposition. Atlantic City, Nov. 5-7 — Contact: Anthony Scalisi, Expocon Management Associates, Inc., 3695 Post Road, Southport, Conn. 06490.

Second Annual Conference on Optical Storage for Small Systems. Los Angeles, Nov. 5-7 — Contact: Technology Opportunity Conference, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

Second Annual Software Management Strategies Conference. Toronto, Nov. 6-7 — Contact: Gartner Group, Inc., 72 Cummings Point Road, Stamford, Conn. 06902.

NOVEMBER 9-15

Information Industry Association 18th Annual Convention & Exhibition. New York, Nov. 9-12 — Contact: IIA, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C. 20001.

Association for the Development of Computer-Based Instructional Systems Annual Conference. Crystal City, Va., Nov. 10-13 — Contact: ADCIS, Room 409, Miller Hall, Western Washington University, Bellingham, Wash. 98225.

Comdex/Fall '86. Las Vegas, Nov. 10-14 — Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

It's anybody's guess. You turn around and he's gone. And you're all alone with one of those totally automatic, look-Ma-no-hands scheduling or rerun management packages. The kind that are never as automatic as some fly-by-night salesperson claimed they'd be. The kind that roust you out of bed at 3 AM to handle a scheduling foul-up.

Alone.

With UCCEL's high support standards, you're never alone. And with our high productivity standards, you know you're getting software solutions that address *all* your needs. Today and tomorrow.

The UCC-7 family enhances your realtime management power.

Our recently updated *UCC-7: Automated Production Control System* is the most dynamic and flexible package you can buy. The only one that's realtime. Comprehensive. Easy to use. And comes with its own TP monitor for easy, independent accessibility.

UCC-7 controls, schedules, monitors and tracks all processing activity online. Then generates status reports by job, system or work area: so you get realtime control over your ever-changing workload. And the power to make processing less labor-intensive. Less error-prone.

This system gives you the power to manage by exception: once you've defined the workload, you eliminate further manual intervention. UCC-7 handles routine situations like manual daily updates and schedules. Freeing you to concentrate on exceptions like abends and tardy user inputs.

UCC-7 consistently meets schedules. Instead of relying on antiquated daily plan methods (which a single change can make instantly irrelevant) it schedules and initiates production automatically, using realtime feedback. It constantly adjusts to the dynamics of your data center and balances job stream priorities with your hardware resources. Increasing throughput and ensuring consistent productivity. It also sequences jobs and provides timely and accurate status, forecasting and history data.

Most importantly, UCC-7 is easy to use. Simply "checking the boxes" on a menu automatically implements your job definition. And eliminates the need for daily batch schedules.

Our *UCC-7RPT: Report Distribution/Tracking System* offers the most extensive tracking facilities of any report management system on the market.

It manages, archives (to tape or disk) and retrieves reports: reducing errors and providing up-to-the-minute status information as well as historical data. Online. It centralizes all distribution, documentation and print-control information in a realtime database. So making changes becomes quick and easy. And batch run updates become a thing of the past. UCC-7 also handles end-user inquiries online. Generating additional report copies without a job rerun and keeping you current with end-user requests.

When jobs are networked from one data center to another, our *UCC-7NCF: Network Communications Facility* provides the automatic feedback you need to maintain host site control. It allows follow-up jobs to be run without delay or intervention. And makes the realtime status of each job available online.

Only UCC-11 can automate all manual rerun-processing tasks.

UCCEL's exclusive *UCC-11: Automated Job Management/Rerun System* is the only MVS package with sophisticated tracking/analysis functions that automate all error-prone manual tasks. It not only prevents many reruns, but reduces the resources consumed by those which can't be avoided. Results: fewer missed deadlines, reruns and errors; increased control, throughput and productivity; and enhanced user satisfaction.

UCC-11 prevents the inevitable job reruns from disrupting processing or consuming valuable resources. It automates your recovery process, so abend jobs can be restarted with a single command. It performs step restarts and reruns without JCL changes, and automates associated data set and OS catalog maintenance. It prevents "NOT CATLGD 2's" and reruns of reruns: increasing the productivity of your resources.

UCC-11 also collects all pertinent job status data automatically, making it available as needed. Its flexible reporting system helps you to isolate the causes of reruns, and assess resource productivity and spoilage.

When they're teamed, UCC-11 gives you automatic control of jobs scheduled and submitted by UCC-7. Reruns and restarts can be set up via UCC-7's formatted screens. And UCC-11's functions can be accessed through any terminal defined to UCC-7.

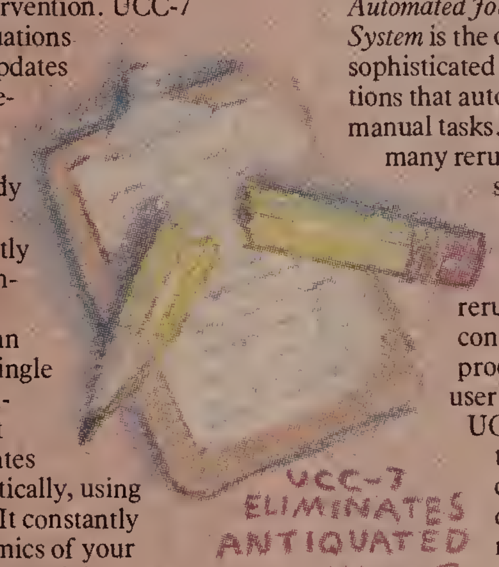
Only UCCEL's support standards ensure consistent productivity.

UCCEL's highly regarded DP professionals stand behind each package we sell, providing complete pre-purchase and on-going consulting. Installation services. Training and maintenance services. Assistance in maximizing your software's flexibility. A 24-hour emergency support hotline. A national users group. Periodic new product releases and client newsletters. All available from a single, reliable source.

You'll always be able to find someone peddling software cheaper than UCCEL's. Even if you have to scour every street corner in town. But he can't come close to UCCEL's high standards of support. And he certainly won't come close to you when problems crop up. With those guys, you're on your own.

For more information on UCCEL's complete line of MVS software, call UCCEL Corporation at 800-527-5012. We'll show you how making our high standards *your* standards can ensure consistent data center productivity.

UCCEL OFFERS COMPLETE PRODUCTS AND SERVICES



UCC-7 ELIMINATES ANTIQUATED SCHEDULING METHODS

THE CALL'S ON US!

UCCEL You can't afford anything less.

Corporate Headquarters: UCCEL Tower, Exchange Park, Dallas, TX 75235, 214-353-7100.

Escape Datapoint!

With DB/C Compiler/Interpreter you can run your Datapoint DATABUS™ programs on IBM, AT&T, SPERRY, PRIME and dozens more high performance computers.

See why hundreds of companies have chosen the Guaranteed Performance of DB/C for their conversions.

Call now for your free technical information package.

(312) 572-0240

Or write:
DB/C
Subject, Wills & Company
800 Enterprise Dr.
Oak Brook, IL 60521

™Datapoint and DATABUS are registered trademarks of Datapoint Corp.

Angst of the BUNCH user

From page 89

mainframe vendor will exit the marketplace, and what happens to me if he does?"

- "Am I missing out on something by staying with my current vendor?"
- "Can I afford to convert?"

The well-publicized financial difficulties of CDC and the examples of GE and RCA show that it is a real possibility for a mainframe vendor to leave the business.

In the past, the company's customer base was bought and supported by another vendor, which provided a migration path to its own equipment. Honeywell bought GE's customer base; Sperry bought RCA's.

The experience of the customers in these situations varied, however. GE customers had a relatively smooth time of it, because the GE architecture became the mainstay of Honeywell's large-systems line.

Missing out

Whether a company is missing out on something by remaining outside the IBM environment depends on several factors, including availability of packaged software, labor supply, vendor support, unit costs and how the mainframe is used.

Some industries, such as public utilities, are highly regulated. Others, such as airlines, require a high degree of cooperation among companies. Both have tended to develop fairly standardized business practices, which make them good candidates for packaged application software. Naturally, there are far more choices available in the IBM environment.

In other industries, packages are used primarily in administrative areas, such as accounting. Packages are generally available for these applications in the BUNCH environment; they are sometimes versions of an IBM package.

MIS personnel recognize that the market for workers experienced in the IBM environment is an order of magnitude larger than that for any incompatible mainframe environment.

But because economic conditions are still favorable and data processing is still an attractive career, those BUNCH users that can meet their additional staffing needs, primarily with trainees, generally are not experiencing labor shortages. Also, those BUNCH users that are the employer of choice in their area seem to have little difficulty in attracting and retaining MIS personnel.

The importance of vendor support and the capabilities of the vendor to provide support and expertise frequently vary from industry to industry and location to location. Thus, either an IBM or a non-IBM mainframe vendor may have an advantage in any specific instance.

Information-intensive businesses such as financial services may find that computer costs are a significant factor in their competitiveness. Such companies will generally do better in the IBM environment, where unit costs — as measured, for example, by cost per millions of instructions per second — are lower and falling faster than in the BUNCH environment. In other businesses, the unit costs of computing may be far less important.

Questions to ask

How is the mainframe used? Is it for a broad variety of applications or a single one? Is it in a variety of modes — batch, interactive, real-time, on-line — or a single one? In dedicated applications, non-IBM mainframes and software may provide a better solution.

Just as packaged software developers and MIS employees recognize that the IBM-compatible market is much larger than any other, so do other suppliers of products and services.

IBM's research and development and low manufacturing cost have put the same kind of competitive pressure that they put on other mainframe vendors on manufacturers of plug-compatible peripherals, including CDC, Memorex Corp. and Storage Technology Corp., and on makers of terminals. But there are still many more such vendors in the IBM environment than in any other.

Similarly, there are more supply manufacturers, systems development firms, personnel contracting firms, recruiters, publishers, educators and trainers catering to the IBM-compatible market than to any other. And as usual, where there is more competition, there tend to be lower prices.

How important these choices and price differentials are to any particular user will obviously vary from company to company.

Even if a firm's concerns indicate a need to move into an IBM environment, the question eventually boils down to the issue of conversion.

There are companies in which current information systems do not support today's business needs. These firms must replace their current systems in order to remain competitive. For them, it probably makes sense to build the new systems in an IBM environment.

There are also companies in which current information systems support today's business needs fairly well, but in which there is a critical need to develop one, or a few, major new application systems.

These companies are usually better off avoiding a conversion and concentrating on the new applications.

In summary, both the decision to remain with a BUNCH vendor and the decision to convert to an IBM environment are valid choices for different companies.

WORTH ITS WEIGHT IN GOLD

By any standard of measure, Walker's General Ledger & financial control system is a whole lot more than just automated accounting.

More functionality. Walker's General Ledger provides you with the added advantages of a sophisticated financial planning and budgeting system. Extensive reporting, modeling, consolidation and forecasting capabilities reduce complex finance and accounting issues to simple solutions.

Superior technology. Completely integrated and interactive, Walker's General Ledger system defines the industry standard for fourth generation technology. From a non-procedural language, to a common data base, to a well defined user interface (all packaged in a truly borderless architecture). Walker technology gives you the information your business needs. When it needs it.

Learn how Walker's General Ledger & financial control system can be worth its weight in gold for your business. Call or return the attached coupon today.

Walker Interactive Products
100 Spear Street, 3rd Floor San Francisco, CA 94105
☐ Yes, please send me more information on Walker's family of financial systems.
☐ Please contact me for a demonstration.

Name Title
Company Phone
City State Zip
IBM Mainframe Software Environment
For more info: call Barbara Bond at (415) 495-8811

WALKER

NEW PRODUCTS

INSIDE

Software & Services/**96**
Microcomputers/**103**
Communications/**108**
Systems & Peripherals/**112**
Price Reductions/**114**

Multitasking tool debuts for LANs

Lan Systems, Inc. of New York has introduced Release 3.0 of its local-area network (LAN) APX Core Executive multitasking software for LANs.

According to the vendor, APX Core can support up to eight tasks, subject to the memory limitations of the computer and the memory requirements of the individual programs.

Features of APX Core include complete access to Microsoft Corp. MS-DOS and IBM PC-DOS commands, full-screen or window view for each task, central access to multitasking from any network station and the ability to move data between tasks.

APX Core is said to run network, MS-DOS or PC-DOS and application software simultaneously and to support network standards for Novell, Inc. and 3Com Corp. networks and IBM's Token-Ring net. It requires 43K bytes of memory plus 5.5K bytes per task.

LAN/APX Core is priced at $750 per eight-node license.

Lan Systems has also introduced the LAN Librarian, a network file cataloging system for LANs. It is said to be a document annotation system that catalogs all work done on a network installation.

Features include automatically maintained catalog cards for each file detailing original author, current user, revision history, subject and key words; a data base of network file activity; the ability to operate across multiple file servers; access to archive files by author, subject or key words; and multiuser backup and restore.

The LAN Shell, the vendor's menu development system for LANs, can be configured to invoke the Librarian automatically, ensuring that users always enter the information needed for file tracking.

The Librarian is available in an Administrative Pack for $495, allowing use on five network nodes. An additional 10-node pack costs $495, and single-user add-ons cost $69.95.

The LAN Shell costs $750 per eight-node license. The single-user price is $195.

NEC releases PC-8500 portable PC, insurance and real estate tools

NEC Home Electronics, Inc. of Wood Dale, Ill., has introduced the PC-8500 portable personal computer.

The PC-8500 features an 80-col. by 25-line, high-contrast LCD screen. It has 64K bytes of internal random-access memory (RAM) and measures 8½ by 12 by 2¼ in. It offers four built-in software programs — Wordstar-to-go, Calc-to-Go, Personal Filer and Telecom. Built-in phone jacks provide access to modular phone lines through the PC-8500's standard 300 bit/sec. modem or enable the unit to be used as an autodialer.

The NEC PC-8500 also provides a parallel printer port and an RS-232C I/O port. A system slot makes it possible to add a 32K-byte RAM cartridge; a 128K byte RAM cartridge with access available for a 128K byte read-only memory cartridge; a CRT/Disk adapter for a monochrome or color monitor; or a 1,200 bit/sec. modem.

The NEC PC-8500 personal computer is priced at $999.

NEC also announced software for the PC-8500 designed specifically for the insurance and real estate industries. Insurance Expert I includes comparative life, cash expert, a client tracking system and an insurance-oriented calculator. Insurance Expert II covers estate planning and trust planning as well as a Social Security evaluator.

The PC-8500 offers 64K bytes of RAM.

Real Estate Expert provides on-site reports and evaluations. It also includes a client tracking system and a specialized calculator.

The software programs cost $299 each, according to the vendor.

CICS management system out

Version 6.2 of The Monitor for CICS has been announced by Landmark Systems Corp. of Springfield, Va.

The Monitor for CICS is an IBM CICS performance management system. According to a company spokesman, Release 6.2 incorporates features such as an interface to IBM's DB2 and SQL/DS data base management systems, allowing users to capture statistics regarding access to both systems from within CICS.

Version 6.2 also includes a CMF utility that allows conversion of Monitor data to IBM's CMF format for use by any CMF-dependent product and enhanced DL/1 support, allowing tracking of DL/1 thread usage.

Other added features include enhanced resource limit controls, allowing automatic termination of a task if it exceeds the user-defined thresholds for storage consumption, noncontiguous CPU consumption, total I/O counts and elapsed runtime; an expanded on-line browse feature, allowing on-line display of all transaction detail to include selection by file identification or any one of 62 other selection criteria; dynamic customization providing object-level CICS release independence; display of Ice/Aids chains; and an optional cancel feature.

The Monitor for CICS is available for a permanent site license fee of $17,500 for MVS, MVS/XA and VS1 systems. It costs $8,000 for DOS/VSE systems, according to the vendor.

```
                   IBM
printf("Hello, world\n");
              ^
```

Meet the Industry's New Standard for Mainframe C Compilers

SAS Institute Inc. announces a mainframe version of the Lattice® C compiler—your key to truly portable applications.

With our compiler, you can develop C programs on IBM 370 machines, interface easily with non-C programs and software packages, and protect your programming investment across operating environments. Virtually every new computer supports C, and portable programs created with the mainframe compiler under OS or CMS will run on any other machine with a C compiler.

The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C.

And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs.

For all the facts—including details on economical annual licensing complete with free technical support and enhancements—call your Software Sales Representative today.

SAS is a registered trademark of SAS Institute Inc. Lattice is a registered trademark of Lattice, Inc.

Copyright © 1986 by SAS Institute Inc. Printed in the USA.

SAS®
SAS Institute Inc.
Box 8000, SAS Circle
Cary, NC 27511-8000
(919) 467-8000 Telex 802505

SOFTWARE & SERVICES

Systems Software

Morino Associates, Inc. has announced **MICS IDMS Component.**

The component is said to collect, organize and store data on usage and performance of Cullinet Software, Inc.'s IDMS Version 5.7 and IDMS/R, running with the IDMS/R Performance Monitor. It provides support for records produced by the IDMS/R Performance Monitor. It generates performance reports in the IDMS environment.

The MICS IDMS Component is licensed for $6,000 for the initial year and $2,200 for the renewal year.

Morino Associates, 8615 Westwood Center Drive, Vienna, Va. 22180.

■

Interactive Solutions Corp. has announced **Version 3 of Keygraf/3000**, an interactive business graphics system for the Hewlett-Packard Co. HP 3000, and has introduced the Keygraf Extended Analysis Option.

Keygraf Version 3 updates Keygraf to work with the HP7440 Color Pro Plotter. The Extended Analysis option provides Keygraf with analytical graphics capabilities including a nontime X-axis type, 16 mathematical functions and 17 additional statistics.

Existing Keygraf users can upgrade for $225. The basic Keygraf system is currently available for a special price of $295. The Extended Analysis Option costs $500.

Interactive Solution, P.O. Box 354, Woodinville, Wash. 98072.

■

Symbolics, Inc. has released the **software source code** for its New Flavors object-oriented programming system.

The code is held in the company's Genera 7.0 operating system and software engineering environment. It serves as a convention and procedure-calling style and a programming language to aid programming.

Prices for the source code are $100 for American National Standards Institute 9-cartridge magnetic tape, $75 for cartridge tape and $25 for IBM Personal Computer diskette media. Hard copy documentation costs $50.

Symbolics, Four New England Tech Center, 555 Virginia Road, Concord, Mass. 01742.

■

Daly & Wolcott, Inc. has announced **Release 1.0** of its **Fixed Assets Accounting System** for the IBM System/34 and 36.

Written in RPG II, the software is menu-driven and designed to track fixed assets from entry to retirements.

Ten different depreciation methods are utilized and a depreciation journal is automatically produced at month's end. Reports produced by the system include fixed assets listed by asset account, physical location, classification code and date of retirement.

The Fixed Asset Accounting System costs $2,500.

Daly & Wolcott, P.O. Box 1509, East Greenwich, R.I. 02818.

■

Tandem Computers, Inc. has announced **Storelink,** an on-line retailing system developed by Signorum, Inc. and Leroux, Pitts & Associates, Inc.

Storelink operates with Tandem Nonstop systems and reportedly does not require the replacement of cash registers or the purchase of a separate nonintegrated minicomputer.

The software is said to act as the central communications link in a point-of-sale network. It handles growing numbers of transactions and can support on-line in-store terminal systems from many different vendors. Applications include flash reporting, credit authorization and price lookup.

Storelink is priced at $125,000.

Tandem Computers, 19191 Vallco Pkwy., Cupertino, Calif. 95014.

■

New Generation Software, Inc. has announced **Interactive Query/38,** a query system for the IBM System/38.

The software is said to allow users to retrieve and format information without a programming language. Features include the ability to connect up to 32 files per query; run queries in batch or interactively; format reports on the screen; create System/38 files that can be accessed by other applications and queries; sort data; and display data in different column, spacing, text and graphic formats. It can also implement IBM's SQL.

Interactive Query/38 costs $5,938.

New Generation Software, 3840 Rosin Court, Sacramento, Calif. 95834.

■

Honeywell, Inc. has announced **Release 2.05** of its **GCOS 4/OS 3**, an operating system for its DPS 4 small mainframe computer.

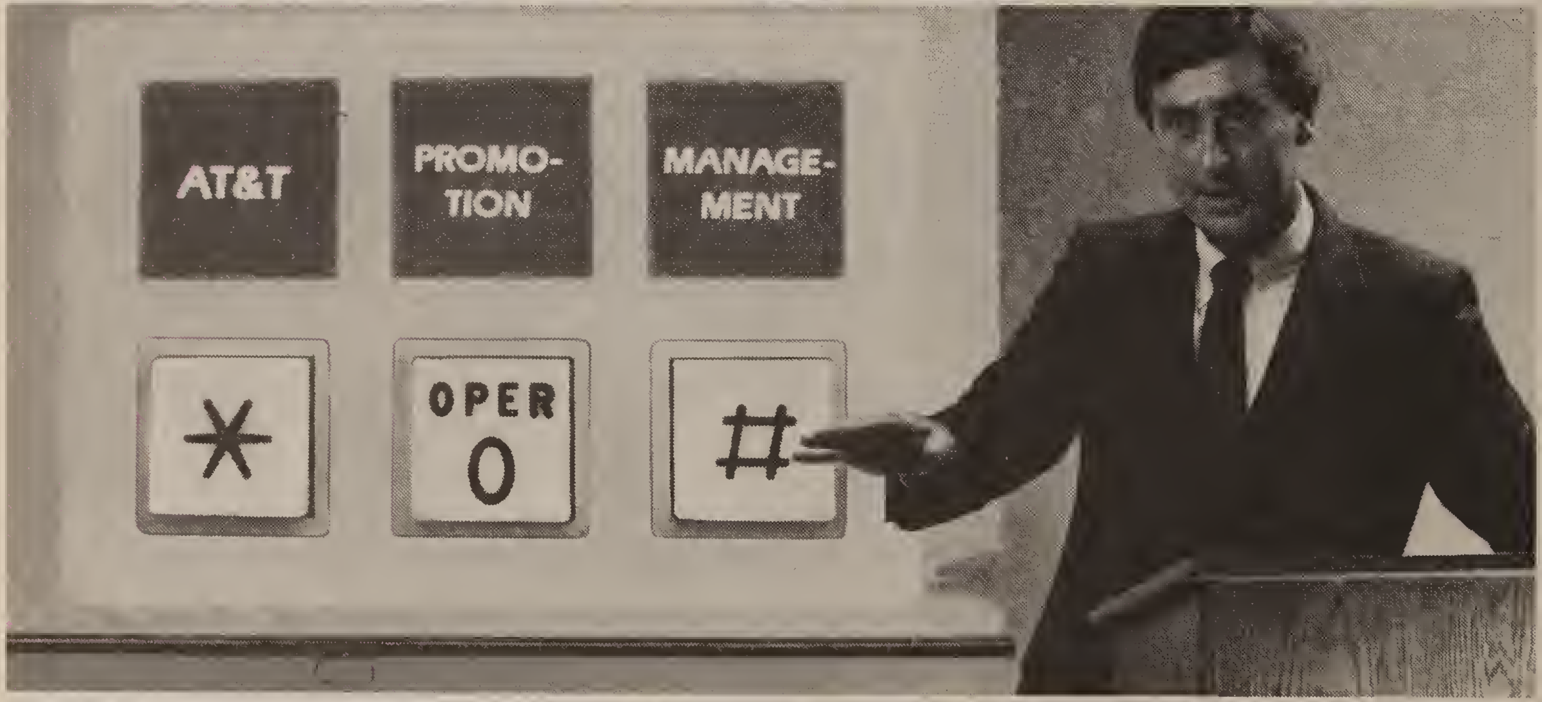
The operating system is built around the vendor's Interactive Data Base System.

According to the vendor, the release features transaction processing with batch capabilities and can handle up to three instruction processors.

The system requires a minimum of 2M bytes of memory and three disk drives. It is available for a license fee of $600 per month.

Honeywell, 300 Concord Road, Billerica, Mass. 01821.

AT&T IS IN SMARTER PROPOSALS.



WITH AT&T TELEMARKETING/PROMOTION MANAGEMENT AND THE AT&T CONSULTANT LIAISON PROGRAM.

For telemarketing and promotion management applications, the inclusion of AT&T 800 Service and AT&T DIAL-IT® 900 Service will lead to smarter proposals.

Because we'll help you show your customers how these services can be used for a wide variety of telemarketing and promotional applications.

From order processing and customer service, to full account management and field service support.

All with excellent transmission quality and traditional AT&T reliability.

But just as importantly, through the AT&T Consultant Liaison Program, we can work with you to integrate our services and applications into your proposals so that your recommendations will maximize your customer's movement and management of information on a global scale.

In addition, our CLP Network Communications Applications and Services manual (available for a small fee) provides you with a comprehensive fingertip reference for all of AT&T's extensive line of network services.

In short, the people and services of AT&T can help you make more informed, strategic recommendations for your customer's complex business needs.

And that's a smarter proposal for you, as well as your customer.

AT&T Telemarketing and Promotion Management and the AT&T Consultant Liaison Program. More good reasons to partner with AT&T.

To find out more, talk with your account executive at AT&T. Or call **1 800 CLP-INFO.**

AT&T
The right choice.

© 1986 AT&T

OK, SORBUS.®

Tell me more.

Let me know just what Sorbus service can do for me.

Name:____________________

Title:____________________

Company:____________________

Street:____________________

City:__________ State:_____ Zip:_____

I'm especially interested in service for the following hardware:____________________

____

Sorbus®
A Bell Atlantic™ Company

In a hurry? Call 1-800-FOR-INFO.

CW-1020

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 20 MALVERN, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Sorbus®
A **Bell Atlantic™** Company
50 E. Swedesford Road
Frazer, PA 19355-9976

The bigger they come, the harder you fall.

Good news: Sorbus® now services the big IBM® 308X series.* So you can enjoy all kinds of power, without enduring all kinds of trouble.

It only makes sense. We already maintain more IBM equipment than anyone but IBM. And we do it so well that a recent reader survey by *Data Communications* judged us the "Best Service Organization." Period. (Our price/performance ratio had been the best for years anyhow.)

And now our two-hour average response time, our 230,000 part-number inventory, and our quality on-site service are all available for your 308X. And for just about any peripheral you might have connected to it, including StorageTek™ hardware.

The bigger your mainframe, the more you need Sorbus. Call today. **1-800-FOR-INFO.**

Sorbus®
A Bell Atlantic™ Company

50 E. Swedesford Road
Frazer, PA 19355

IBM is a registered trademark of International Business Machines, Inc.

StorageTek is a trademark of Storage Technology Corporation.

*Available in most major metropolitan areas.

NEW PRODUCTS/SOFTWARE & SERVICES

• ADVERTISEMENT • ADVERTISEMENT •

Directories List 46,000 DP Users

Each directory of computer installations lists 10,000-16,000 computer users covering the NY Metro Area (NY, NJ & CT), the Mid-Atlantic States (PA, VA, MD, DC, WV & DE), and the New England area (MA, ME, NH, RI & VT) Each site includes a profile of the hardware installed, software installed, (languages, databases, etc.), consultants used, future plans, applications and DP executives' names, titles, and phone numbers. An index provides quick access to 133 cross references by hardware, software and industry. Price: NY-$700, MA-$395, and NE-$395. Call (212) 683-0606. Computer Management Research, Inc. 20 Waterside Plaza, NY, NY 10010.

J. D. Edwards & Co. has announced its **World Distribution Systems** for the IBM System/38.

The release is composed of Inventory Management, Order Processing and Billing and Purchasing.

According to the vendor, the World Distribution Systems is integrated with J. D. Edwards' other World products, including General Ledger, Accounts Payable and Accounts Receivable.

Each module is priced at $20,000 and includes both source and object code, training and full user documentation.

J. D. Edwards, Suite 4400, 4949 S. Syracuse St., Denver, Colo. 80237.

Applications packages

Deneb Systems, Inc. has released an **item billing module** for integration into Revision 3.0 of the Deneb Systems' Construcion Accounting and Estimating System for personal computers.

The item billing module was designed to produce a progress billing by either units or percentage of completion. Features include the ability to track the original estimate, change orders, stored material, units of work complete, bill to date and retainage.

Prices range from $895 to $1,295.

Deneb Systems, Suite 2C, 201 Riverside Drive, Dayton, Ohio 45405.

■

Cycle Computer Consultants, Inc. has announced **E/V-Maint,** a software package for equipment and vehicle maintenance.

According to the vendor, the software is said to provide access to current maintenance information.

E/V Maint runs on the IBM System/36 and is priced from $2,250 to $4,500.

Cycle Computer Consultants, 29 Continental Place, Glen Cove, N.Y. 11542.

■

Grocery Technology has introduced **Fincalc-36** and **Fincalc-38,** financial calculation software for the IBM System/36 and 38, respectively.

According to the vendor, features of the programs include printing of amortization schedules and calculation of future values from a stream of payments or present lump sum.

Also included are calculation of internal rate of a stream of payments or future lump sum; calculation of regular payment on a loan; calculation of present value of a stream of payments or future lump sum and calculation of sinking fund deposits.

Each program is priced at $100.

Grocery Technology, P.O. Box 10054, Atlanta, Ga. 30319.

■

Sun Microsystems, Inc. and **Structural Dynamics Research Corp.** have announced that Structural Dynamics' **I-Deas** mechanical computer-aided engineering and design software runs on the Sun-3 family of technical workstations.

According to the vendor, I-Deas offers an integrated capability for solid modeling and design engineering analysis drafting and testing. It features a project relational data base manager for common access to data across all project applications.

The I-Deas software is available on Sun-3 workstations for multiple users for $16,600.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

Don't Let Changes Catch You By Surprise.

Uncontrolled changes can cause problems in the operation of a data center. Now you can track and monitor hardware, software, data set, and operational-parameter changes that affect your ability to manage an MVS data center. And you can do it simply and instantly—with DELTAMON®/MVS from Candle Corporation, the makers of OMEGAMON.®

DELTAMON takes the guesswork out of dealing with changes by telling you what actually changed—not just what was supposed to change. With DELTAMON you will be able to identify modifications to individual programs in production libraries, track alterations to MVS tuning parameters, and much more.

DELTAMON gives you greater overall accountability because it verifies planned changes. You can respond instantly to senior management questions about scheduled and unscheduled changes to your system with a variety of online and hardcopy reports.

For more information on how DELTAMON can help you see immediate improvements in the operation of your data center, just ask. We'll also send you the booklet "10 Reasons for Tracking Changes." You're in for a pleasant surprise. Simply call Terry Forbes toll free at **(800) 843-3970.**

!Candle

Candle Corporation
1999 Bundy Drive, Los Angeles, CA 90025
Copyright © 1986 Candle Corporation. All rights reserved.

Marcam Corp. has announced **Prism**, a production management and planning software package written in RPG III for the IBM System/38.

Prism consists of several integrated modules, including the foundation module, resource management, resource processor, resource planning, costing, order processing and purchasing.

Features include user-defined vocabulary, a menu-management system, on-line assistance, a training data base and a personal computer interface.

Prism is priced at $22,000 per module.

Marcam, 19 Crawford St., Needham, Mass. 02192.

■

Collier-Jackson, Inc. has announced **Release 2.02.A** of its **CJ/Accounts Payable** system running on Digital Equipment Corp.'s VAX series of minicomputers.

Enhancement highlights include an on-line Help facility, expanded vendor history and an option to automatically reschedule payables that have missed the discount terms, the vendor said.

Other enhancements include the addition of automatic distribution accounts for sales tax and freight and an additional 1,099 categories and reporting features.

A $14,000 license fee for the system includes object code, source code, training, installation, documentation and an implementation plan, according to the vendor.

Collier-Jackson, 3707 W. Cherry St., Tampa, Fla. 33607.

■

Chi/Cor Information Management, Inc. has announced the **Chi/Cor Deduction Management System** designed to provide users with a method of tracking, monitoring and maintaining deductions claimed by their customers.

The system is said to provide the necessary information both on-line and with batch reports for customer service, claims, promotions, accounts receivable and credit collection. It also provides information on sales service and other departments that are involved with the resolution and collection of billing and payment differences.

The software is written in ANSI-standard Cobol and is available for IMS-DB/DC and CICS/VS, the vendor said.

The system is priced at $95,000.

Chi/Cor, 10 S. Riverside Plaza, Chicago, Ill. 60606.

■

Software Solutions, Inc. has introduced **Facts Release 4.0** of its multiuser package designed for wholesale distribution and general accounting.

Facts runs under Unix or Microsoft Corp.'s MS-DOS, according to the vendor.

The package is made up of applications modules including inventory control, orders and invoicing, accounts receivable, sales analysis, general ledger, accounts payable and payroll.

System executive modules include job stream, menu and security, the vendor said.

All modules are menu driven.

The new release features a purchase order processing module, as well as enhancements to the other modules.

Facts Release 4.0 is priced from $4,000 to $20,000.

Software Solutions, 1688 Highway 29 S., Lawrenceville, Ga. 30245.

■

Joiner Associates, Inc. has released **Version 2.0** of its **Jass** software for designing and analyzing two-level factorial experiments.

Release 2.0 is said to enable the user to create experimental designs. According to the vendor, Jass leads the user step by step through the process of designing an experiment.

Other features reportedly include regression analysis, correlations and summary statistics as well as additional data manipulation features such as ubiquitous expressions and data subsetting with BY and WHERE commands.

Jass runs on IBM Personal Computers as well as Digital Equipment Corp. VAX systems under VMS and Unix. It costs from $895.

Joiner Associates, P.O. Box 5445, 3800 Regent St., Madison, Wis. 53705.

Languages

Zeta-Soft Ltd. has ported its **Zeta-C** language compiler and development environment to the Texas Instruments, Inc. Explorer LISP Machine.

The Explorer version is a complete implementation of industry standard C. It is compatible with the AT&T Unix System V compiler as well as the University of California at Berkeley 4.2 Unix compiler, according to the vendor.

The compiler costs $5,800 for the initial CPU and $1,000 for each additional CPU.

Zeta-Soft, P.O. Box 139, 94 Sciarappa #2, Cambridge, Mass. 02141.

■

Softaid, Inc. has announced **64180 Basic**, a Basic compiler for the Hitachi Ltd. 64180 microprocessor.

The compiler is said to handle the processor's internal memory management unit, giving the user the ability to write programs up to 1M-byte in length while maintaining CP/M compatibility. It supports multitasking.

64180 Basic costs $450.

Softaid, 8930 Route 108, Columbia, Md. 21045.

▫ INTRODUCING ▫

INTELLECT/DB2

USING AI TO DELIVER DB2 TO MANAGEMENT

Introducing INTELLECT/DB2 — the system that dramatically enhances your investment in DB2 by making DB2 accessible to managers in plain English. INTELLECT/DB2 was developed by Artificial Intelligence Corporation, the pioneer in commercial AI technology and the creator of INTELLECT, the AI-based natural language processing software used by hundreds of organizations worldwide.

Attend this free half-day seminar and learn about the six requirements for delivering DB2 to management.

1. NATURAL LANGUAGE

INTELLECT/DB2 allows managers to ask questions of a DB2 database in English. Its use of advanced AI techniques allows users to request information in any way. The system understands ambiguous questions, and lets managers express themselves using their own vocabulary, which it learns as it's used. AI-based natural language delivers DB2 in English, eliminating the need to learn a computer language.

2. AD HOC ANALYSIS

INTELLECT/DB2 enables managers to get answers to complex questions easily and see the results in the format they want. Statistics such as totals, minimums, maximums and percentages, and complex functions including correlations and ratios need only be requested. Users see results displayed in summary form or graphs automatically. And they get all this without knowing anything about the database structure, because INTELLECT/DB2 uses AI to handle the details automatically and transparently.

3. APPLICATION BUILDING

INTELLECT/DB2 provides facilities to build personal applications in English. Within the system's security constraints, users can create and update tables, build forms for data presentation, and request reports. The system's AI techniques free the user from having to specify the details.

4. PROPER USE OF DB2

INTELLECT/DB2 uses all DB2 capabilities such as security, the catalog and indexes to the system's advantage. And as a SQL generator, INTELLECT's interface to DB2 takes full advantage of DB2's power.

5. OPEN ARCHITECTURE

INTELLECT/DB2 allows users to employ DB2 databases or other databases and file structures in many additional ways. With INTELLECT's PC Link, they can ask questions in English on a PC, have the results from DB2 reformatted into a Lotus 1-2-3 worksheet, and sent down to a PC. And, advanced work in AI provides voice input to your DB2 database.

6. THE RIGHT VENDOR SUPPORT

Our 11 years of experience in delivering commercial AI business solutions to over 450 customers means that you get fast, expert assistance in using INTELLECT/DB2. You have access to complete product support, including a telephone hotline, comprehensive training programs, professional consulting, and tutorial documentation.

Attend this free seminar. See for yourself how using AI can help you deliver DB2 to management. Call our Seminar Registration Office today at (617) 890-8400 to reserve your seat, or return the coupon.

Atlanta, GA	Nov. 12
Boston, MA	Dec. 11
Chicago, IL	Nov. 6
Chicago, IL	Dec. 4
Dallas, TX	Nov. 5
Detroit, MI	Dec. 3
Los Angeles, CA	Oct. 29
New York, NY	Dec. 16
Philadelphia, PA	Nov. 13
San Francisco, CA	Oct. 30
S.F., Palo Alto, CA	Dec. 11
Toronto, Canada	Nov. 5
Washington, D.C.	Dec. 17

Call (617) 890-8400

_____ Register me for a free INTELLECT/DB2 seminar.
City__________ Date__________
_____ I can't attend, but send a brochure.
Name__________
Title__________
Company__________
Street__________
City__________
State__________ Zip__________
Telephone (   )__________

INTELLECT is a trademark of Artificial Intelligence Corporation. DB2 is a registered trademark of IBM

Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

AICorporation

Artificial Intelligence Corporation 100 Fifth Avenue Waltham, MA 02254 9156
(617) 890 8400 Telex 989606

NEW PRODUCTS/SOFTWARE & SERVICES

Philon, Inc. has released its **Fast/Cobol** and **Fast/Basic-M** languages for the Digital Equipment Corp. VAX series of minicomputers running under the Ultrix operating system.

Fast Cobol is an ANSI 74 compiler said to be compatible with Ryan McFarland Corp.'s RM/Cobol.

Features include record- and file-locking facilities, support of random, sequential and indexed sequential files and the ability to call C subroutines.

Fast/Basic-M is a true compiler said to be compatible with Microsoft Corp.'s Basic.

It features separate module compilation, the ability to call Ultrix utilities from within a program and support of native hardware floating-point arithmetic.

Fast/Cobol costs from $4,500 to $15,000, and Fast/Basic-M costs from $3,600 to $12,000.

Philon, 641 Avenue of the Americas, New York, N.Y. 10011.

Utilities

Inference Corp. has announced its enhanced C language version of **ART 3.0**, the company's automated reasoning tool for developing expert systems.

ART 3.0 reportedly speeds up processing and avoids random program halts. It does not require searching for memory because memory allocation and deallocation have already been built into it.

ART also has an added capability called multimethods. This capability is said to combine procedural-based, object-oriented programming as well as rule-based programming.

According to the vendor, the C language version of ART 3.0 is available for Digital Equipment Corp. VAX computers and Sun Microsystems, Inc. Sun-3 workstations. ART 3.0 is also said to be available for the IBM RT Personal Computer.

Pricing for ART 3.0 starts at $65,000.

Inference, 5300 W. Century Blvd., Los Angeles, Calif. 90045.

◆

Precision Visuals, Inc. has announced extensions to its **Addsys-3000** graphics software package to support device features in Tektronix, Inc. 4128 and 4129 color graphics workstations.

Addsys-3000 is a subroutine library that is said to provide direct access to local three-dimensional segment instancing in addition to three-dimensional graphics input.

According to the vendor, the Addsys-3000 package also has the ability to manipulate three-dimensional images dynamically on the computer screen.

The package also reportedly allows three-dimensional polygons to be color-shaded to simulate natural lighting effects.

In addition, the Addsys-3000 package is said to provide calls to access the Tektronix sectioning planes by which a three-dimensional object can have a front section removed to show a cutaway of the interior, according to the vendor.

The price for the Addsys-3000 package for use on Digital Equipment Corp. VAX computers ranges from $1,000 to $10,500, depending on the CPU.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Elxsi Co. has released the **EMS Environment**, which allows users of Digital Equipment Corp.'s VMS operating system to migrate to Elxsi's System 6400 parallel multiprocessor.

The products include EMS/ECL, an implementation of DEC's Digital Command Language (DCL) interpreter; EMS/ERT, which provides many of the VMS System Services and run-time library functions; an interactive text editor for VMS that offers complete EDT compatibility; a new release of Elxsi's Fortran compiler for EMS; and a new release of EDMS, the data base management package compatible with RTI Technology, Inc.'s Ingres 3.0.

Both releases are free to current Elxsi customers.

EMS/ERT and EMS/ECL cost $20,000 packaged together.

The text editor costs $2,000.

Elxsi, 2334 Lundy Place, San Jose, Calif. 95131.

◆

Bramalea Software Systems has introduced **Batchmaster,** a batch subsystem for the Prime Computer Corp. Prime Series 50 systems.

Batchmaster is said to enable users to define, use and monitor the batch environment. It features automatic scheduling of cyclic jobs, flexible use of queues, priority-based reservation of queues, named resources, streaming of sequential jobs and a complete job history.

Batchmaster costs $2,000 for a site license and $3,500 for a corporate license.

Bramalea Software Systems, Suite 5014, Interfirst Plaza, 901 Main St., Dallas, Texas 75202.

Focus Data Systems, Inc. has announced the **Print Control** utility for the IBM System/38.

The utility is said to give System/38 users control of output queues and print writers.

It features two levels of user defaults and a prompt mode.

Print Control utility costs $100.

Focus Data Systems, 44 W. Berkshire, Lombard, Ill. 60148.

◆

Interpreter, Inc. has released a **document conversion program** that is said to allow several dissimilar word processing systems to send documents to NBI, Inc.'s Integrated Workstation.

The Integrated Workstation is said to produce documents containing text, data and graphics. According to the vendor, text can be prepared on a

Which way wo
learn about text ma

On your own?

For years text management has hovered on the outer fringes of MIS consciousness.

Which is strange, considering how important it is to some of the key people MIS has to serve.

Like company attorneys faced with an unexpected lawsuit.

It's at times like these that text management software has proven its value in organizations all over the world—delivering benefits people didn't even know existed a short while ago, and creating a crescendo of demand at the very highest organizational levels.

What does this mean to you? Several things:

First, it means you'd better understand what text management is all about—before your users do. (Hint: if you're thinking "word processing," read on.)

Second, it means you'd better select a text management system with the features *users* need to obtain information—plus the features *you'll* need to maintain system integrity. Users need specialized text search and index facilities conventional DBMS's don't offer; you need database and system control facilities dedicated retrieval systems don't offer.

And third, it means you'd better start evaluating text management systems and vendors without delay. And there's no better way to begin that evaluation than by taking a close look at INQUIRE/Text—the most comprehensive, proven text management software system on the market.

Text management; It's not word processing. And it's not data management.

Traditional corporate information systems do a great job managing structured data. Unfortunately, the information most needed by decision-makers is often unstructured—embedded in the text of documents such as letters, memos, reports, contracts, and transcripts. Because this material has traditionally been beyond the reach of online systems, access to it has been slow, tedious, and error-prone. Word processors and other office automation systems have greatly accelerated document creation and distribution, but they are all but useless in making the actual information content of documents available as an online resource.

A text management system fills this need by providing highly sophisticated facilities for online index, search, and retrieval of information in stored documents. With a text management system, users at all organizational levels can pinpoint specific pieces of information within vast volumes of text—instantly. And once they've found the information, they can edit it, combine it, and report it out with complete flexibility.

Not surprisingly, the biggest text management system users have tended to be companies engaged in complex litigation or regulatory proceedings. But as text databases have proved their value in these initial applications, they have increasingly been used in others as well—from competitive intelligence gathering to online maintenance of technical documentation to a full array of corporate records management tasks. And as senior executives have become comfortable with text management facilities, they have increasingly mandated their use throughout the organizations that report to them.

The results: a dramatic improvement in the overall quality of information available to decision-makers. And a dramatic increase in pressure on MIS to deliver top-flight text management capability.

INQUIRE/Text: The features users need. The control you need.

As the demand for text management capability has grown, so has the number of vendors claiming to provide it. But few of these vendors offer the features, the flexibility, and the track record of Infodata's INQUIRE/Text.

INQUIRE/Text's automatic indexing and powerful keyword search and retrieval facilities have set industry standards in text management for years. INQUIRE/Text's easy-to-use menu screens, ability to handle both structured and unstructured fields, and flexible interfacing options have made it a hit with users in all departments, while also easing the tasks of the MIS personnel charged with implementing it. And INQUIRE/Text's track record in over $50 billion worth of litigation support applications—to say nothing of the rest—makes it easy to justify to top management.

INQUIRE/Text: It's the first thing you need to know about text management. ◆

INQUIRE/Text runs on IBM and compatible mainframes under MVS/TSO, MVS/CICS and VM/CMS.

dissimilar system and transmitted to the Integrated Workstation for further enhancements.

Interpreter-supported systems and packages include Wang Laboratories, Inc.'s, IBM's 5520 and Displaywriter and Samna Corp.'s Wordperfect and Wordstar.

Prices range from $7,500 to $25,000.

Interpreter, 11455 W. 48th Ave., Wheatridge, Colo. 80033.

■

Nastec Corp. and **Tarkenton Software, Inc.** have announced **Gammalink**, a software product said to automate the systems development process.

Gammalink provides an interface between Nastec's Designaid personal computer-based structured analysis, design and documentation system and Tarkenton's Gamma host-based application generator, according to the vendor.

Designaid features graphics and text for documentation, a design dictionary and analysis capabilities. Gamma is also said to feature Cobol code, maps and Job Control Language; an application data base; and a screen and report painter.

Gammalink costs $10,000 per site license. Designaid costs $6,900 and Gamma costs $186,000.

Nastec, 24681 Northwestern Highway, Southfield, Mich. 48075.

■

Softlight Corp. has introduced **Performance Analyst**, a system performance monitor for use with the IBM System/36.

Performance Analyst is said to provide summaries of data collected by IBM's System Measurement Facility. It also features graphs, an exception report, a summary file and a history file.

Custom reports can also be created, the vendor claimed.

Performance Analyst is priced at $199.

Softlight, 303 S. Woodrow St., Clinton, S.C. 29325.

■

Mackinney Systems Co. has announced **CICS/CEMT From Batch Release 4.0.**

The product allows CEMT commands for CICS to be issued through batch Job Control Language. The version is said to communicate with up to 99 different CICS.

A Header card may be used to direct all commands to a specific CICS or to all CICS systems.

Other features include the ability to use a single command to process OPENs, CLOSEs, ALLOCATEs and UNALLOCATEs of user-defined groups of files, instead of one command for each file.

CICS/CEMT is priced at $495 for DOS and $695 for OS/MVS. It is also available for lease.

Mackinney Systems, 2674-A S. Glenstone, Springfield, Mo. 65804.

■

Cosmic has announced the **SMU** program, a source management utility for managing the development and maintenance of software.

According to the vendor, SMU controls an organization of configured data sets that contain source, object and load module files. The user can interactively perform such functions as create, edit, compile, link and load. SMU manages file history data sets.

Using SMU commands, local files can be compared with the official production version, data set availability can be confirmed and previous program versions can be fully restored.

SMU is written in PL/I and assembler for IBM mainframes operating under OS/MVS and supporting ISPF.

Source code costs $2,500. Documentation costs $52.

Cosmic, The University of Georgia, Computer Services Annex, Athens, Ga. 30602.

■

Cadre Technologies, Inc. has introduced **Teamwork/Access**, a data base access and integration tool for use with the Teamwork family of Computer Aided Software Engineering (CASE) tools.

Teamwork/Access is said to allow users to integrate the CASE tools to create an integrated software life cycle support environment. Users can link Teamwork to configuration management tools, code generators, librarian tools and more.

Teamwork/Access is priced at $2,500 per network.

Cadre Technologies, 222 Richmond St., Providence, R.I. 02903.

■

Advanced Technology, Inc. has announced **Version 4.0** of its Digital Equipment Corp. VAX-based interactive design tool, **SuperPDL**.

Version 4.0 features a full interface to DEC's Code Management System, running under VMS.

It also offers hooks that enable any other configuration management tool to be interfaced to SuperPDL,the vendor stated.

Other features include report modifications, renaming capabilities, an

ld you rather
agement software?

Or from your
legal department?

Today's rising tide of litigation is placing extraordinary demands on corporate legal departments—forcing attorneys to prepare and manage cases of unprecedented volume, complexity, and public visibility.

In this environment, it's no wonder that so many legal departments are turning to computerized systems to manage critical aspects of their work. And one of the key functions they're looking for is the ability to perform fast, accurate online text searches—a function no system performs better than INQUIRE/Text.

INQUIRE/Text: Proven in companies—and in court.

INQUIRE/Text is a proven, cost-effective system that facilitates the full range of legal department activity—not to mention broader corporate information management strategies.

With INQUIRE/Text, the time and cost of document searches can be sharply reduced. Even more important, INQUIRE/Text can actually enhance professional performance—especially under severe case loads.

By enabling people to share updated information instantaneously, INQUIRE/Text facilitates the preparation of complex cases while minimizing the error potential associated with large volumes of paper documentation. And by tracking key events and costs, INQUIRE/Text contributes to improved efficiency without compromising the quality of service provided.

Equally important, INQUIRE/Text is a system proven in some of the most pressing litigation in American history. It's being used right now in the massive asbestos industry liability case. And it's been relied on for years in other cases ranging from antitrust to negligence—to administrative hearings before government regulatory bodies.

INQUIRE/Text: It's the system legal departments need. It's the system you need to know.

What works for attorneys can also work for MIS—and others.

You might expect a system as sophisticated as INQUIRE/Text to be difficult for non-DP-oriented users to master. But it's not. Even attorneys who are new to computers find INQUIRE/Text easy to learn and quickly habit-forming. As they become more experienced, they soon discover additional capabilities that can materially enhance their ability to make and present decisions and opinions.

But attorneys aren't the only ones who benefit from INQUIRE/Text. The very features that make INQUIRE/Text so ideally suited for legal applications also serve the needs of other departments such as planning, marketing, regulatory affairs, the library—and not least of all, MIS itself. In fact, INQUIRE/Text is a perfect system for the online maintenance of a wide variety of technical documentation. With its large capacity and flexible database facilities (including automatic backup and recovery, usage monitoring and accounting, and multilevel security), INQUIRE/Text protects the organization's interests while serving the individual.

This ability to meet both MIS and end-user needs is no accident—it was designed into INQUIRE/Text from the start. Which is one more reason why INQUIRE/Text is the place to start your investigation of text management software.

Speaking of which: if you've read this far, you probably know as much about text management as your law department does. So if they start presenting a case for text management, you've already got a case to present in return. A case for INQUIRE/Text. ◆

**INQUIRE®/Text:
Text management that
works for the legal department.
And for MIS.**

INFODATA®

Infodata Systems Inc.
5205 Leesburg Pike
Falls Church, 22041
(800) 336-4939
In Virginia and Canada,
call (703) 578-3430.

Get the rest of the evidence.

I'm interested in INQUIRE/Text. My application is ____________.
Name ____________
Title ____________ Company ____________
Address ____________
City ____________ State ____ Zip ____________
Phone ____________
Machine/operating system environment
CPU model ____________
☐ MVS/TSO ☐ MVS/CICS ☐ VM/CMS

INQUIRE and Infodata are registered trademarks of Infodata Systems Inc. INQUIRE is covered by U.S. Patent Number 3670310.

IDMS* users!!

PMDC is an online real-time
and historical
performance monitor
for IDMS DC/UCF systems

For more information on **PMDC** contact

SPS
Software Product Services Ltd
Clears Court Church St East Woking Surrey England GU21 1HL UK
Tel + 44 4862 68588 28555

*IDMS is a trademark of Cullinet Software Inc.

extended copy function and full support of wild card characters, according to the vendor.

Version 4.0 of SuperPDL is priced from $14,000 to $31,000, depending on the VAX model.

Advanced Technology, 19th Floor, 350 Fifth Ave., New York, N.Y. 10118.

■

Shaw Systems Associates, Inc. has released **Problem Report Tracking System**, which was designed to document and guide problem-solving procedures on the Hewlett-Packard Co. HP 3000 computer.

Problem Report Tracking System is said to provide on-line data entry and inquiry. It maintains customer contact information along with a record of previous activity.

The system is priced at $3,700.

Shaw Systems, Suite 600, 6200 Savoy Drive, Houston, Texas 77036.

■

Macro Business Services has announced **Macrodoc**, an automated documentation tool for the IBM System/38.

Macrodoc is said to summarize data format to record how programs, physical and logical files, libraries and fields relate to each other. Features include external file-field definitions with key fields, ownership and access rights, configuration reports, created files accessible by query and documentation of data files by application.

Macrodoc costs $500.

Macro, Suite 380, 2107 N. First St., San Jose, Calif. 95131.

Precision Business Systems Ltd. has introduced the **Supervisor Series,** a set of security tools for the Digital Equipment Corp. VAX/VMS.

The Supervisor Series is said to monitor and control local and remote terminal usage.

The Supervisor Series reportedly consists of three programs: Photo, Observer and Advisor.

The Photo program logs and plays back a terminal session, and the Observer program allows a user to watch another user's terminal session.

The Advisor allows a user to redirect his keyboard so that keystrokes from his terminal are executed in the context of another user, according to the vendor.

The complete Supervisor Series costs $1,495 with each program priced at $595.

A site license costs $1,785 per program or $4,485 for the series, according to the vendor.

Precision Business Systems, 33 Rector St., New York, N.Y. 10006.

Data base management systems

Four packages in the **Informix** line of data base software from Relational Database Systems, Inc. are now said to be available for **Charles River Data Systems, Inc.**'s Universe line of Unix-based systems.

The four Informix packages include SQL, a relational data base management system based on IBM's SQL, and ESQL/C, providing two sets of tools for developing specialized applications. Other features include C-ISAM, which is said to provide a library of C language functions for creating and manipulating indexed file systems, and File-It, an interactive menu-driven file manager.

According to the vendor, the Informix software costs $1,600 for SQL. It costs $1,200 for ESQL/C, $495 for C-ISAM and $450 for File-It.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 10701.

■

Information Dimensions, Inc. has released its **Ddlwiz**, a program that reportedly will enable its users to define Basis data bases without programming.

Basis is a full-text data management system from Battelle Development Corp.

According to the vendor, Ddlwiz is said to employ a series of friendly, comprehensive screens that users fill in to define standard or long-text data bases.

Ddlwiz can reportedly be used to create single-user data bases, data bases requiring user access as well as data entry security or long-test data bases.

The data bases feature Basis's capabilities, which are said to include automatically stored numbers in segmented files, data conversion and text that can be indexed by phrase, word or full field, according to the vendor.

Ddlwiz is available for Digital Equipment Corp. VAX computers as well as for IBM and Wang Laboratories, Inc. computers.

Ddlwiz is priced from $1,500 to $10,000.

Information Dimensions, 655 Metro Place S., Dublin, Ohio 43017.

■

Tominy, Inc. has announced that it has ported its multiuser **Data Base-Plus** software system to the NCR Corp. Tower computer series running under the Unix operating system.

Data Base-Plus consists of a logical data base management system, screen handler, print handler and query and report writer, according to the vendor.

As a result, Data Base-Plus is said to provide an integrated environment for application development.

Programming language support includes Cobol, Fortran, assembler, PL/I and RPG.

Data Base-Plus software system for use with the NCR Tower is priced from $2,500 to $16,500.

Tominy, 4221 Malsbary Road, Cincinnati, Ohio 45242.

INTELLIGENT CASE SOFTWARE AT AN INTELLIGENT PRICE.
1.3.1.1.1
1.3.1.1.2
1.3.1.1.3
FINISHED ITEM PART NUMBER
PURCHASE PART QUANTITY
HELP
CLEAR
EXIT
close
save
IBM

Intelligent Systems Analysis begins with Intelligent Software choices. Meet your most intelligent choice. The Yourdon Analyst/Designer Toolkit. At $1995, the Analyst/Designer Toolkit has everything you need to support all of your MIS projects, no matter how complex; the most advanced graphics system of any PC-based CASE tool lets you create all of the diagrams associated with the Yourdon Structured techniques, raises your productivity levels, and increases your work speeds by as much as 30%.

$1995

Error and consistency checking, an integrated data dictionary, and one of the easiest-to-use menu systems make for a professional system that offers everything you could want in a CASE system—at a remarkably low price. And lest we forget: the Toolkit includes technical support from the people who know Structured Analysis and Design better than anyone. And we ought to. After all, we wrote the book on it. Now we've written the Software.

The Yourdon Analyst/Designer Toolkit.

YOURDON Division of DeVRY INC. 1501 Broadway New York, N.Y. 10036 TEL. (212) 391-2828

MICROCOMPUTERS

Systems

ACP International, Inc. has announced the **Advanced 286,** an IBM Personal Computer AT-compatible system.

The system includes a full-function keyboard, 200W power supply, clock with battery backup and an Intel Corp. 80286 processor. Other features include eight expansion slots, according to the vendor.

The Model I configuration includes 640K bytes of memory and a 1.2M-byte, 5¼-in. floppy disk drive.

The Model II configuration features an additional 30M-byte hard disk drive.

The Advanced 286 is priced from $1,495.

ACP International, Suite 100, 200 N. Tustin Ave., Santa Ana, Calif. 92705.

■

Cad Design Systems, Inc. has introduced **Cadengine,** a computer-aided design system.

Cadengine features Version 2.5 of Autodesk, Inc.'s Autocad and the vendor's Acadplus tablet menu.

The system includes an IBM Personal Computer XT-compatible, 640K bytes of random-access memory, a 20M-byte hard disk, a 360K-byte diskette drive and an Intel Corp. 8087 math coprocessor, according to the vendor.

Also included are two RS-232 serial ports, one parallel port, Microsoft Corp. MS-DOS 2.1 and a six-pen A/B-size plotter and digitizer with stylus, the vendor said.

Cadengine is priced from $5,995.

Cad Design Systems, Suite D, 1305 Remington Road, Schaumburg, Ill. 60195.

■

Apple Computer, Inc. has announced the **Apple IIGS** personal computer.

The PC features 256K bytes of random-access memory, eight expansion slots and support for the Appletalk network.

It offers seven graphic modes and can play up to 15 voices simultaneously for synthesizing music and speech. According to the vendor, it can run the Apple II family software package without modification.

The base price for the Apple IIGS is $499.

Apple Computer, 20525 Mariani Ave., Cupertino, Calif. 95014.

Software applications packages

Franklen Computer Systems, Inc. has announced the **SAM-11** sales leads and prospect follow-up software for IBM Personal Computers and compatibles.

SAM-11 manages the sales follow-up process from original prospect contact.

Features of the product include user-definable prospect codes and an import/export capability for linking SAM-11 and other spreadsheet or word processing programs, according to Franklen Computer Systems.

The SAM-11 sales leads and prospect follow-up software is priced at $695, according to the vendor.

Franklen Computer Systems, 456 S. Central Ave., Glendale, Calif. 91204.

■

Alexander Programming Corp. has announced **Cashm**, a portfolio management package for IBM Personal Computers and compatibles.

Cashm is said to use linear programming techniques to structure the optimal portfolio to match a stream of liabilities.

Features include user-definable sector constraints, rollover reinvestment rates, bond-for-bond swapping and total portfolio reoptimization.

Also featured is a variety of analysis tables, including cash flows, duration, yield and sector and maturity distribution.

The Cashm package is priced at $10,000.

Alexander Programming, Suite 1624, 420 Lexington Ave., New York, N.Y. 10170.

■

Bluebird Systems has announced that its **Turns** application software package for the distribution industry is now available under Superdos, a multiuser operating system for the IBM Personal Computer and compatibles.

Turns is said to provide major distribution functions such as billing, inventory control, accounts receivable and sales analysis. Superdos is said to support up to 26 simultaneous users and more than 800M bytes of disk storage.

The Turns package is priced from $2,000 to $15,000, depending on the system configuration and the modules purchased.

Bluebird Systems, Suite A, 6352 Corte Del Abeto, Carlsbad, Calif. 92008.

Software utilities

Intex Solutions, Inc. has announced **XYZ:Spread**, designed for use with Lotus Development Corp.'s 1-2-3 or Symphony.

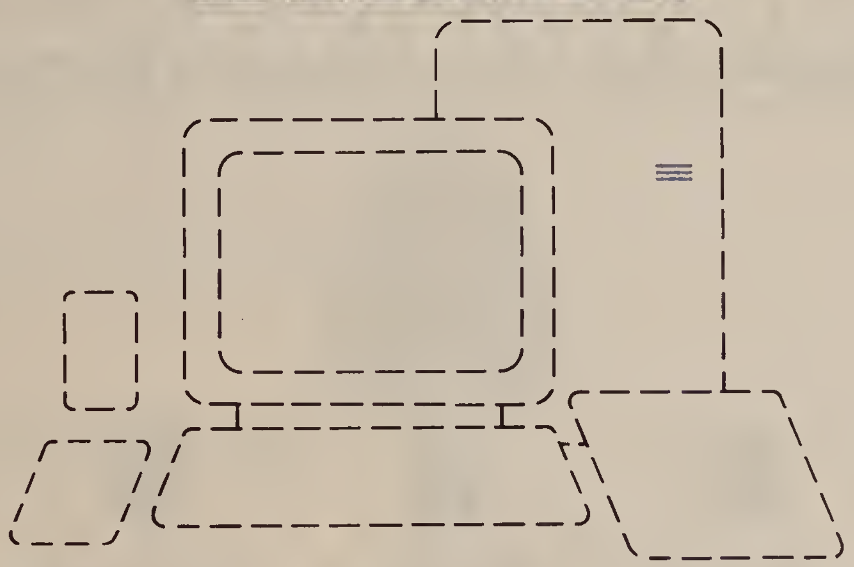
XYZ:Spread is said to transfer data across 1-2-3 spreadsheets. It displays the source and target worksheets together on the same screen and keeps track of source and target locations. It also performs downward allocations.

The software runs on the IBM Personal Computer and compatibles.

It is priced at $4,145 for a 12-work sheet version with a full trade-

Continued on page 104

Think.



Thinkahead.

At Spectragraphics, we've always had a company philosophy of not just thinking, but thinking ahead. It's something to strive for. And it does more than just sound nice in our corporate brochure.

It pays off.

For example, last year we introduced the DesignSet 1080,™ a graphics terminal that's compatible with the IBM 5080.

As good as it was at the time, the most important feature of the DS 1080 was its potential. A designed-in potential for growth with easy field upgrades. So every DS 1080, this year's or last's, can have all the most up-to-date features we have to offer. With complete compatibility and maintainability. Which gives our model a future without planned obsolescence.

Unfortunately, that wasn't an option given to customers of companies who merely think. Customers who are now working with out-of-date models that aren't even a year old.

In addition to the foresight we have in designing products, Spectragraphics has the track record, stability and service to back them up. Because we know that those things help just as much in making your system run smoothly.

So, all that being said, the decision is up to you.

You can think.

Or you can think ahead. With Spectragraphics.

SPECTRAGRAPHICS
Where your ideas take shape.

Spectragraphics Corp., 10260 Sorrento Valley Rd,
San Diego, CA (619) 450-0611.

DesignSet 1080 is a trademark of Spectragraphics Corporation.

Continued from page 103

up allowance toward the 1,000-work sheet version, which costs $395, according to the vendor.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

■

Hawaiian Village Software has announced **Turbo Master**, a general-purpose screen and application generator for IBM Personal Computers and compatibles.

The product is said to generate complete ready-to-run Borland International, Inc. Turbo Pascal programs.

It consists of a master screen editor and generator, a master ISAM data base generator, a master menu generator, master tools, a resident ISAM module and screen-capture utilities, the vendor said.

Turbo Master is priced at $99.95.

Hawaiian Village Software, 1109 Pennsylvania Ave., St. Cloud, Fla. 32769.

■

Macropac International has unveiled **101 Macros for Symphony**, a collection of macros designed for Lotus Development Corp.'s Symphony software.

The product includes macros that automate the creation of custom-made forms; do project management scheduling; include bold and italic type, page breaks and margin settings in Symphony's sheet mode; simplify the steps for record data sort; and insert rows and calculate subtotals in sheet mode.

Other features include macros that address form letters and print labels, create graphic slide shows, speed up recalculation time and add a pop-up notepad, calendar and calculator.

101 Macros for Symphony costs $49.95.

Macropac, Suite 168, 19855 Stevens Creek Blvd., Cupertino, Calif. 95014.

Software data base management systems

Core Analytic, Inc. has introduced **Visionbase**, a family of Dbase III data base software packages that store photographic images that can be linked to textual data.

The program was designed to work with the AT&T Truevision line of color photographic digitizing boards.

All packages contain the capability to capture, store and associate full-color photographs with data base descriptive characteristics so that any retrieval will deliver photographs as well as text information.

The photographs can be output to another device, such as a color printer or slide maker.

Visionbase is priced at $595 in its stand-alone Image Capture Board version.

Core Analytic, 674 Rt. 202-206 N., Bridgewater, N.J. 08807.

Software enhancements

Micro Data Base Systems, Inc. has released **Version 2.01** of its **Knowledgeman/2** data base.

Version 2.01 is said to run faster and allow for larger data base applications.

The number of records per table for IBM PC-DOS and Microsoft Corp. MS-DOS is increased to over one million, the vendor said. Version 2.01 also supports the IBM Enhanced Graphics Adapter.

Other features of Knowledgeman/2 are single-keystroke menu selection and the ability to build a library of customized functions and create menus automatically.

It costs $695 and runs on most personal computers with a minimum of 512K bytes of random-access memory and a 2M-byte hard disk.

Micro Data Base Systems, P.O. Box 248, Lafayette, Ind. 47902.

■

Softcraft, Inc. has announced **Release 3.0** of the **Xtrieve** on-line data retrieval system.

Xtrieve is a menu-driven, data base query tool that allows users to provide an interface to applications developed with Softcraft's Btrieve file management system. Xtrieve 3.0 allow users to customize menus, Help files and error messages to the language of the customer and the specific applications.

Other features of Xtrieve 3.0 include the addition of password security and user access to view up to eight files at one time instead of four.

Xtrieve requires MS-DOS 2.0 or 3.0. It costs $245 for the single-user version and $595 for the local-area network version.

Softcraft, P.O. Box 9802, #917, Austin, Texas 78766.

■

Haar Industries, Inc. has announced the **5XM release of MUC-DOS**, a multiuser, multitasking real-time Microsoft Corp. MS-DOS-compatible operating system for IBM Personal Computer XTs, PC ATs and compatibles.

The new release offers real-time, multitasking support for up to twelve multipage workstations, 8M bytes of random-access memory, 500M-byte hard disks, multiple hard disks, five system printers and additional dedicated printers.

MUC-DOS is priced from $495 to $1,795 as an upgrade kit and $6,200 to $20,500 as a preconfigured system, according to the vendor.

Haar Industries, 2600 Virginia Ave. N.W., Washington, D.C. 20037.

Softcraft, Inc. has announced **Release 3.0** of the **Xtrieve** on-line data retrieval system.

Added features include the ability

Continued on page 106

If you can't put a Hayes modem on every PC in your IBM network, here's the next best thing.

© 1986 Hayes Microcomputer Products, Inc.

*Manufacturer's estimated retail price.

It's new communications software from Hayes called Smartcom II® for the PC Network.

It lets you share modems. So even PC's without their own modems can communicate outside the network.

Before now, if you needed to communicate outside the network, you had to physically go to wherever the modem was. That, in turn, meant bumping the operator off his modem-equipped PC, so that you could handle your communications.

Hayes Smartcom II for the PC Network puts an end to all the delay and inconvenience. Now, when a PC needs the modem, the user is automatically connected from his own desk. So communications capabilities are immediately available to everyone on your network, whether their PC has a modem or not.

You only buy one software package per modem. The workstation part of the software can then be duplicated for each PC on the network, at no extra cost. It's better than having a site license!

Each PC can have its own password, define its own log-on procedures, set its own macros, and use all the other outstanding operating features of our standard Smartcom II while connecting with any of the shared modems on the network.

You get all this for only $599*! And it's backed by Hayes, the PC communications leader.

So if you currently utilize, or are contemplating adding, IBM PC networks, you should also add Smartcom II for the PC Network. For efficient communications. Without delay.

See your authorized Hayes dealer for details. Or contact Hayes at 404/441-1617.

Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, Georgia 30348.

Hayes®

Say yes to the future

Yes! I want to make every second count.

Please rush me more information on the following productivity software products!

☐ STABILIZE™/CICS
☐ InterTest®
☐ VERIFY™
☐ DataVantage™

Or call us toll-free at 1-800-526-0272. Or in NJ, 201-592-0009.

Name ____________________ Title ____________________
Company ____________________ Phone ____________________
Address ____
City ____________________ State __________ Zip __________
Mainframe ____________________ IBM PC ☐ No ☐ Yes How many? __________
TP Monitor ____________________ Release ____________________
DBMS ____
Operating System: MVS __________ DOS/VSE __________ VM __________

CW-KO6

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 897 FORT LEE, NJ 07024

POSTAGE WILL BE PAID BY ADDRESSEE

On-Line Software
International, Inc.
Fort Lee Executive Park
Two Executive Drive
Fort Lee, New Jersey 07024-9990

...tick...tick...tick...

Make every second count with productivity tools from On·Line Software.

Why let system outages and lengthy testing and development procedures waste hours of your valuable time? With these sophisticated productivity aids, you'll do far more work, with far less effort.

VERIFY.™

Deliver quality CICS applications and meet deadlines every time.

VERIFY, now in Release 2.2.1, is an automated quality assurance system that lets you deliver reliable applications *without* spending long hours re-keying test inputs and visually comparing test outputs. Because it provides fast and accurate checking of CICS applications, VERIFY helps you introduce new and updated programs (as well as migrate to CICS Release 1.7) without missing a beat.

STABILIZE™/CICS.

Increase system availability by 90%.

STABILIZE prevents CICS "crashes" before they occur by detecting and automatically repairing the system corruption that causes them. With STABILIZE, you can reduce system outages by a phenomenal 90%! Its concise, on-line diagnostic reports allow you to quickly pinpoint the cause of a problem, so you can make sure it never happens again.

InterTest.®

Speed CICS testing and debugging.

The industry standard with over 2,000 users worldwide, InterTest is an interactive testing and debugging aid that prevents downtime and increases programmer productivity an average of 46%.* Four kinds of breakpoints handle all your testing needs. And with InterTest's new Release 2.5, the program is now even faster and easier to use.

DataVantage.™

Develop and test IMS and DL/1 data bases quickly and easily.

With DataVantage, you can create reliable test data bases and manipulate them with ease, down to the field level. The program automatically provides complete and accurate subsets of data bases, eliminating incomplete samples and the need to write "one-time-only" programs. DataVantage helps you quickly resolve all logical relationships between data bases *before* installing your application in production mode.

Don't waste a second.

Put On-Line Software's productivity tools to work for you beginning right now. Call or write us to arrange for a free 30-day trial of any of these products. On-Line Software International, Inc., Two Executive Drive, Fort Lee, NJ 07024. In New Jersey and Canada, call 201-592-0009.

800·526·0272

On·Line Software International
Authorities in IBM® Software

---

*The 46% productivity figure was the average number reported by InterTest users in a survey that was conducted by Ernst & Whinney, one of the nation's leading public accounting firms. IBM is a registered trademark of International Business Machines.

Our software programs are exclusively marketed throughout continental Europe by ITT affiliates. For information call: Austria (0222) 7226870; Belgium (02) 3701811; France (01) 4545 6705; Germany (0711) 880-2760; Holland (07) 0219 111; Italy (06) 912881; Norway (02) 638800; Spain (01) 241 9790; Sweden (08) 7360150. On-Line Software's distributor in Israel is Semech T.S.S., Ltd. 3-370253. On-Line Software's office Brussels, Belgium (02) 640-1436. In the UK call (01) 950 3576.

Continued from page 104

to write customized menus, password security and a built-in report writing option. The Xtrieve documentation has been expanded as well.

Xtreive 3.0 is priced at $245 for the single-user version and $595 for the local-area network version. Current users can upgrade for $40.

Softcraft, P.O. Box 9802, #917, Austin, Texas 78766.

■

Compuview Products, Inc. has announced **Vedit Plus,** an upgraded version of its word processing text editor.

Vedit Plus allows users to split the screen into several windows of different size and shape, the vendor said.

The windows can be used simultaneously for functions such as program development, multiple-file editing, word processing and spell checking.

Pop-up menus have also been added.

Vedit Plus is priced at $185. Users of previous versions can upgrade for $60.

Compuview Products, Suite 300, 1955 Pauline Blvd., Ann Arbor, Mich. 48103.

■

Systat, Inc. has announced **Systat 3**, an upgraded version of its statistical package for personal computers.

New procedures include nonlinear estimation, repeated measures and discriminant analysis, the vendor said.

Other enhancements of the package include the Systat Executive, which offers menu and batch execution of Systat modules, new statistical routines and an expanded and revised manual.

Version 3 also introduces a full-featured statistical package for the Apple Computer, Inc. Macintosh.

Systat 3 costs $595. Current users can upgrade for $75.

Systat, 2902 Central St., Evanston, Ill. 60201.

Communications

Dayna Communications, Inc. has announced a **FT100** file transfer device.

The FT100 is said to transfer data between 5¼-in. Microsoft Corp. MS-DOS disks and the Apple Computer, Inc. Macintosh system through either an RS-232 serial port or a small computer system interface port.

This allows MS-DOS data to be used within any Macintosh applications program, according to the vendor.

The FT100 works with either a Macintosh 512K or a Macintosh Plus. The transfer process includes a choice of text, binary or Macbinary formats.

The FT100 is priced at $595 in the 5¼-in. disk drive version.

Dayna Communications, Suite 530, 50 S. Main, Salt Lake City, Utah 84144.

■

Curtis, Inc. has announced **Softport**, a software switchable, serial/parallel port adapter for the IBM Personal Computer and compatibles.

Softport is said to allow one of the computer's serial ports to be switched to one of four output connectors, eliminating the need for a hardware switch box or unplugging and plugging connectors.

Switchport is a half-size card that provides one Centronics Data Computer Corp. parallel port and one serial RS-232 port.

The switching program can be run manually or incorporated in a batch file.

Softport is priced at $195.

Curtis, 22 Red Fox Road, St. Paul, Minn. 55110.

Data storage

Micro Technology, Inc. has unveiled its **MQD12** Winchester disk drive controller.

The controller reportedly supports up to four 5¼-in. ST506 Winchester disk drives on Digital Equipment Corp. Q-bus-based computers.

Diagnostic functions such as loop-back, buffer and a variety of read and seek tests are stored on the controller in nonvolatile random-access memory, according to the vendor.

The controller can be modified without the need for switches or jumpers.

The MQD12 Winchester disk drive controller costs $1,495.

Micro Technology, 1620 Miraloma Ave., Placentia, Calif. 92670.

■

Maynard Electronics announced the **Maynstream 60** tape backup system in cassette version.

The Maynstream 60 is said to allow users to save up to 60M bytes of data on single ⅛-in. tapes. It is available in both portable and internal versions.

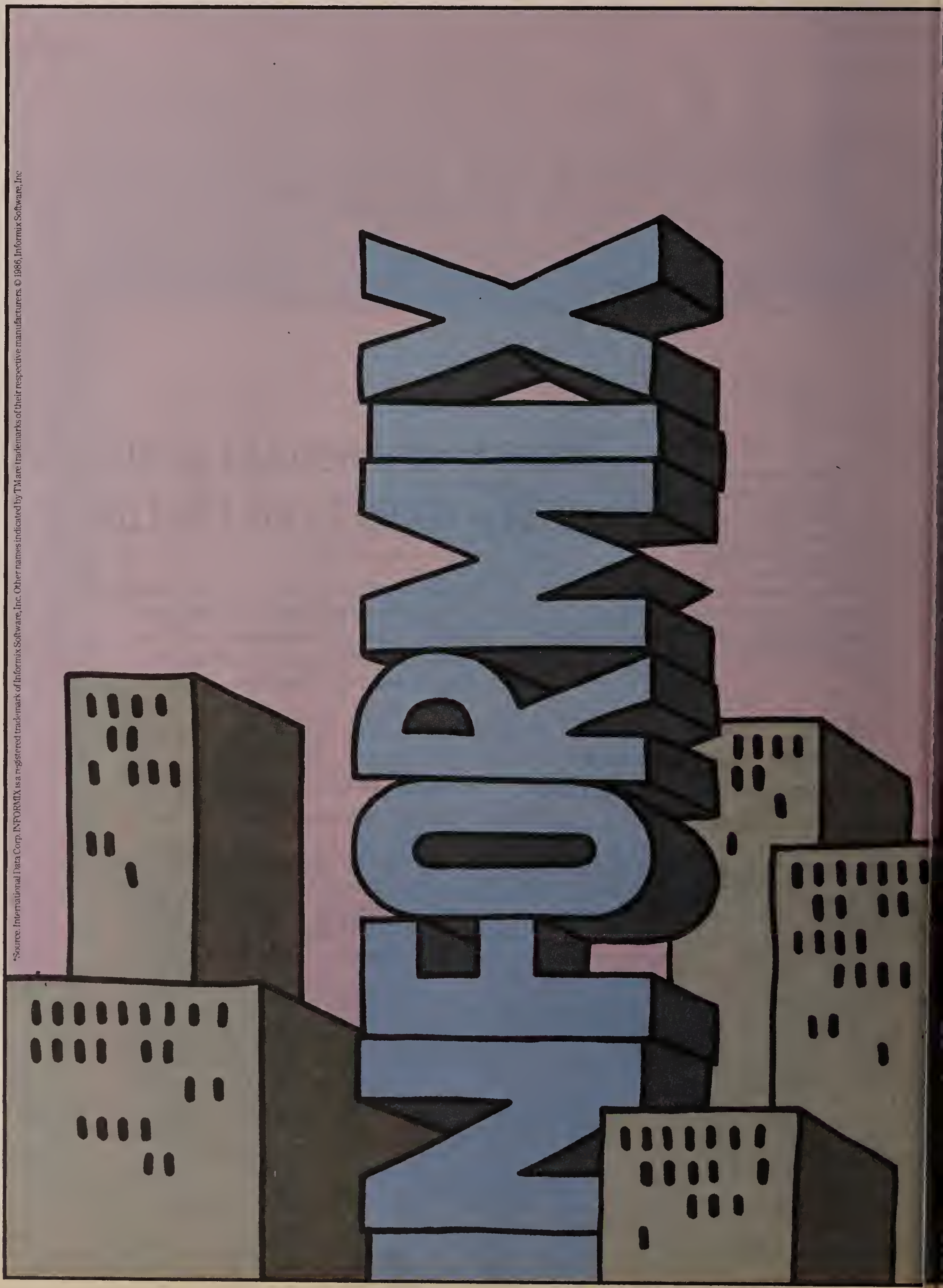
The Maynstream 60 portable is priced at $1,595. The internal version costs $1,195.

Maynard Electronics, 460 E. Semoran Blvd., Casselberry, Fla. 32707.

Printers/Plotters/Peripherals

Design Computation, Inc. has released **DC/Autorouter II**, a diagonal autorouter for IBM and AT&T personal computers and compatibles.

DC/Autorouter supports 45-degree routing as well as pad sizes and trace widths, off-grid placement of pad and vias and user-selectable routing options, the vendor said. Another feature is a switch that allows the user to select between even distribution of routes across all layers or biased routes for the densest routing on the outer layers to facilitate



*Source: International Data Corp. INFORMIX is a registered trademark of Informix Software, Inc. Other names indicated by TM are trademarks of their respective manufacturers. © 1986, Informix Software, Inc.

NEW PRODUCTS/MICROCOMPUTERS

debugging. It allows manual routing of critical traces before, during or after running the autorouter.

DC/Autorouter II costs $2,450. Current users will receive a free upgrade.

Design Computation, 10 Frederick Ave., Neptune, N.J.

■

Printronix, Inc. has announced the **Personal Laser Printer**, a laser printer that was designed for desktop personal computer-based applications.

The printer offers 12 page/min. printing with 300- by 300-dot/in. resolution. It is compatible with the Diablo 630 from Epson America Corp., with IBM Graphics, Hewlett-Packard Co.'s Laserjet and Laserjet Plus.

The Personal Laser Printer has a 250-sheet automatic paper feeder cassette plus a second 50-sheet tray. It comes standard with six fonts.

The Personal Laser Printer is priced at $2,995.

Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

■

Hewlett-Packard Co. has announced the **Draftpro** eight-pen plotter for personal computer-aided design applications.

The plotter creates multicolor output on architectural and engineering C/D-size and metric A1/A2-size paper, vellum or polyester film, the vendor said.

It comes standard with an RS232-C interface.

The Draftpro plotter is priced at $5,400.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Board-level devices

Access Associates has introduced **Alegra**, a memory expansion unit for Commodore Business Machines, Inc. Amiga Personal Computer.

The Alegra expansion unit is said to add 512K bytes of external memory to the Amiga PC.

The use of semi-custom logic and a printed circuit design allows for future expansion to 2M bytes by replacing memory and configuration devices, the vendor stated.

Power is supplied to Alegra by the Amiga at the expansion connector, the vendor said.

Total power consumption is said to be less than 5W.

The Alegra expansion unit is priced at $379.

Access Associates, 491 Aldo Ave., Santa Clara, Calif. 95054.

■

Intercontinental Micro has introduced the **CPS-Q6A**, a four-on-one application processor slave board.

The CPS-Q6A contains four 8-bit, 6-MHz banked slaves and is upgradeable to 10 MHz.

Each slave has a Z80B-compatible HD64180 CPU, two serial I/O ports and 128K bytes of on-board, random-access memory. The board draws 2.5 amps on the 8-volt line.

Four RS-232 serial interface cards are said to provide additional printer support.

The CPS-Q6A is I/O mapped and can work as either a slave or an I/O processor, according to the vendor.

The CPS-Q6A slave board is priced at $1,995.

Intercontinental Micro, 4015 Leaverton Court, Anaheim Calif. 92807.

■

Zaki Corp. has introduced the **Memory Share** board, said to expand the memory of an IBM Personal Computer, PC XT or compatible to one megabyte.

The Memory Share board comes with two banks of 384K bytes of memory and an RS-232 serial port.

According to the vendor, by employing bank-switching technology, Memory Share maintains the entire memory address within Microsoft Corp.'s MS-DOS address space of 640K bytes.

With Memory Share in the system, one user can run programs requiring 640K bytes, while a second user can run programs up to 448K bytes, the vendor said.

Memory Share is priced at $395.

Zaki, Maple Technology Park, 420 Maple St., Marlboro, Mass. 01752.

■

Pronto Computers, Inc. has introduced its **HR-1200** series of IBM Personal Computer-compatible color graphics boards.

The boards reportedly provide flicker-free graphics at 1,280- by 1,024-pixels with either 8-bit, 256 color display or 4-bit, 16-color display from a palette of 4,096 colors.

The graphics boards include a 256- by 12-color look-up table, three high-speed digital/analog converters and 1.5M bytes of memory per screen image.

The 1,280- by 1,024-pixel version with 256 simultaneous color display capability costs $3,495 and the 1,280- by 1,024-pixel with 16-color capability costs $2,795, the vendor said.

Pronto Computers, 3730 Skypark Drive, Torrance, Calif. 90505.

■

Adax, Inc. has introduced its **PC-SDMA**, synchronous direct-memory access serial controller.

It is said to be for the IBM Personal Computer, PC AT and RT Personal Computer running Microsoft Corp. Xenix or AT&T Unix System V that features multiple protocol control on two popular interfaces.

The board operates on either RS-232C or RS-449 interfaces. It also

Continued on page 108

INFORMIX®

It's the relational database management system that's a big part of a lot of big companies. Like Citicorp, Sheraton, EDS/General Motors, Hewlett-Packard and Manufacturers Hanover Trust to name only a few.

Which should come as no surprise. After all, INFORMIX is the best-selling RDBMS for UNIX™* And has been for years.

And now it's making quite a name for itself in MS™-DOS and computer networks. With VMS™ on the way.

For a brochure, call 415/322-4100. Or write Informix Software, Inc. (formerly Relational Database Systems) at 4100 Bohannon Drive, Menlo Park, CA 94025.

INFORMIX

The RDBMS for people who know better.™

Continued from page 107

supports multiple low-level communications protocols on Xenix. For higher baud rate applications, the PC-SDMA with RS-422 drivers and receivers is capable of 1M bit/sec., the vendor said.

The PC-SDMA board costs $790, according to the vendor.

Adax, 77 Dwight Way, Berkeley, Calif. 94710.

■

Definicom Systems, Inc. has introduced the **MMM**, a 32-bit graphics board family for IBM Personal Computers and compatibles.

The MMM board features an additional 144-pin interboard connector block that is separate and independent of the normal motherboard edge connectors.

Minimum clock rate is 16.7 MHz, resulting in a 50-MHz pixel update rate, the vendor said. The board family consists of two computing engines based on the 68020 CPU and 68881 floating point unit.

The DSI-780 and the DSI-020 can both be clocked at rates up to 20 MHz. The graphics extender board is programmable for pixel configuration.

The DSI-020 (16 MHz) costs $1,994; the DSI-780 at 16 MHz costs $3,295; and the graphics extender board costs $1,495.

Definicom Systems, Suite 108, 31324 Via Colinas, Westlake Village, Calif. 91362.

■

Dolen Computer Corp. has introduced the **DC1-8** graphics add-on board for IBM Personal Computer XTs, PC ATs and compatibles.

The graphics board is equipped with 1M byte of memory and a triple, 6-bit color palette for a selection of over 260,000 colors, the vendor said.

It uses one expansion slot and has an 8 MHz graphics coprocesor chip that performs drawing operations such as vectors, ellipses, filled shapes and hitting and clipping.

The board can reportedly be configured for a variety of resolutions from 640 by 480 pixels up to the maximum limits determined by the hardware.

The DC1-8 graphics board costs $2,895.

Dolen Computer, P.O. Box 599, Norwalk, Conn. 06856.

■

May-Craft Information Systems, Inc. has announced the **286 Express Card**, a half-slot accelerator for the IBM Personal Computer and PC XT.

The 286 Express is said to replace the 8088 chip found in an IBM PC or XT with an 80286 microprocessor, allowing it to run faster than the standard PC AT.

According to the vendor, an 8K-byte cache memory feature provides zero-wait-state access to most used code and data.

With the card, all exisiting random-access memory, hardware and peripheral cards can be used without software modification, the vendor said.

The 286 Express is priced at $595.

May-Craft Information Systems, 4312 Beltwood Pkwy. S., Dallas, Texas 75244.

■

Apparat, Inc. has introduced the **Limbo II**, a 1.28M-byte expanded memory and multifunction board.

According to the vendor, Limbo II can fill system memory to 640K bytes and use up to 1.28M bytes of random-access memory (RAM) for expanded memory. Limbo II comes with software that can support up to two boards and is compatible with Lotus Development Corp., Intel Corp. and Microsoft Corp. Expanded Memory Specification.

Other features include a serial and parallel port, clock/calendar and game adapter.

The Limbo II costs $299 with 256K bytes of RAM installed or $499 with 1.28M bytes of RAM.

Apparat, 6801 S. Dayton, Englewood, Colo. 80112.

COMMUNICATIONS

Voice/data communications

The **PBX Systems unit of ITT Business & Consumer Communications division** has announced the **ITT PBXpress**, an enhancement to its System 3100 digital voice/data private automatic branch exchange (PABX).

The product is a voice/mail system said to provide voice messaging capabilities as an adjunct to the System 3100 or other PABXs. It supports up to 1,000 users and broadcasts messages to 125 users, using a standard touch phone.

It is available with storage capacities from five to 30 hours and supports from two to 14 ports.

Pbxpress is priced from $28,000 to $82,000.

ITT, 6131 Falls of the Neuse Road, Raleigh, N.C. 27609.

■

Dynapac Systems Co. has announced the **Secure Access Directory System** (SADS), a call-validation feature for its PSX family of packet-switching exchanges.

SADS is said to be a data base supervisor that operates on PSXs to validate IDs and passwords from the users of network terminals.

The SADS software can operate on the Dynapac PSX Network Control Center or can be distributed to additional PSX nodes.

SADS costs $7,500 for the first copy and $2,000 for each additional copy.

Dynapac, 5350 Shawnee Road, Alexandria, Va. 22312.

Highlight your DASD problems to gain better online performance!

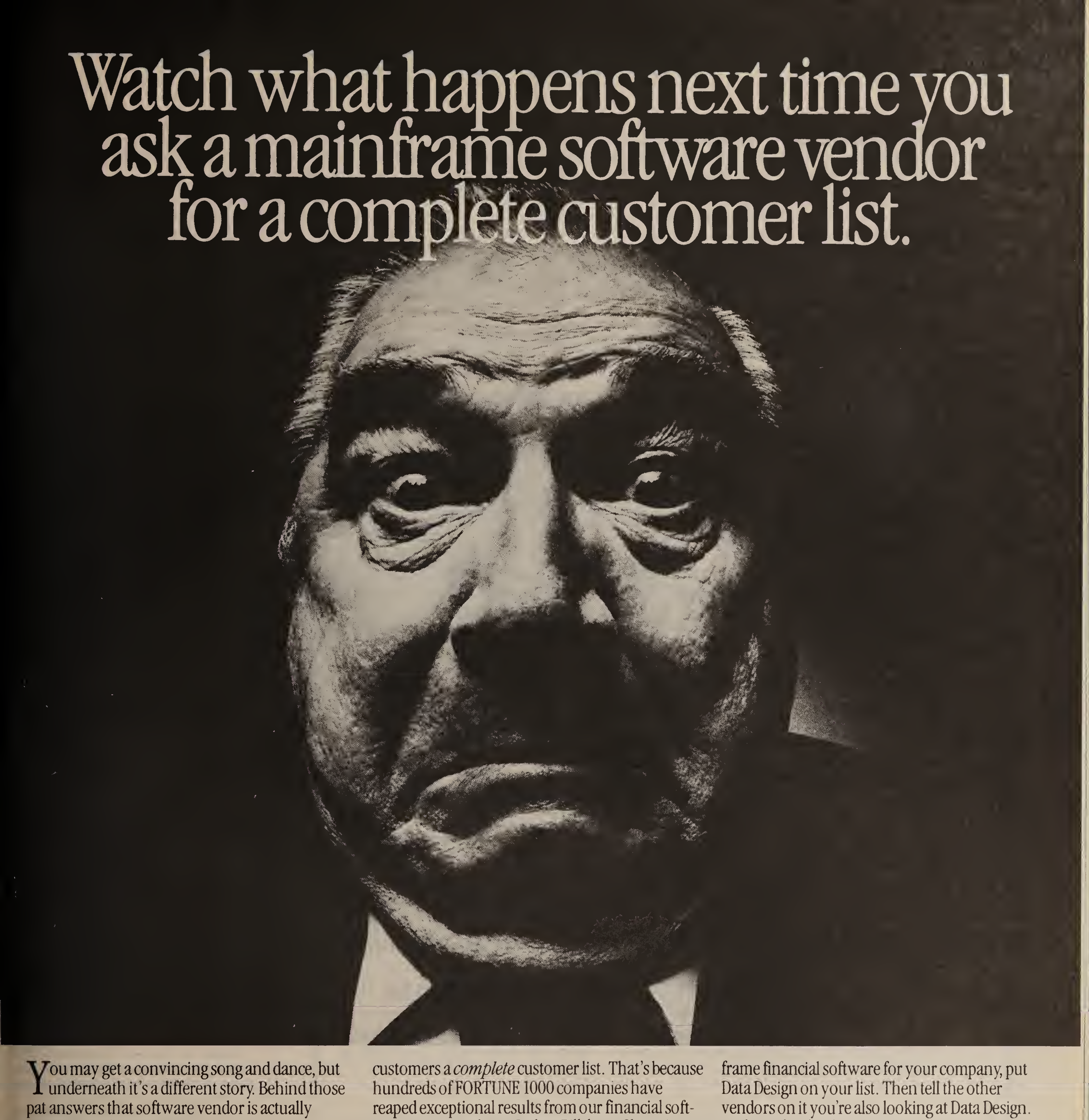
DASDMON highlights critical DASD I/O contention problems easily and comprehensively at your MVS or MVS/XA installation. DASDMON identifies the problems and also offers solutions via online displays and reports. It provides all the relevant details of DASD performance from the system level to dataset and job levels. DASDMON makes it easy to improve DASD I/O response time and gain better online performance.

DASDMON features include:

- ISPF realtime displays automatically identify specific jobs and datasets that are causing poor I/O performance.
- Rules-based problem analysis locates the bottlenecks (path, volume, etc.) and recommends action for DASD tuning.
- A CACHE analysis component computes the "cache hit ratio" at the dataset level to optimize the use of expensive cache controllers.
- Control cards are automatically generated to efficiently reorganize volumes and Partitioned Datasets.

Call us today at (800) 323-2600 for your FREE 30-day trial.

DUQUESNE
SYSTEMS
Two Allegheny Center
Pittsburgh, PA 15212
(800) 323-2600
(412) 323-2600 Inside PA


Watch what happens next time you ask a mainframe software vendor for a complete customer list.

You may get a convincing song and dance, but underneath it's a different story. Behind those pat answers that software vendor is actually sweating and squirming.

Why don't they want you to see a complete list? Simple. They know that their size and name familiarity do not guarantee happiness. Many "single source" or "all-things-to-all-people" vendors have, at best, uneven quality across a multi-application product line. They know that their customer list may contain a good number of less-than-happy clients. It's difficult for these vendors to commit the human and monetary resources necessary to produce the type of superior product available from a firm that specializes in a single application area. A firm like Data Design.

Data Design develops mainframe financial applications software. Period. We understand all our users' requirements and are therefore able to provide the necessary support: over 40 percent of our support and installation staff are CPA's or have MBA's.

Data Design doesn't balk at giving prospective customers a *complete* customer list. That's because hundreds of FORTUNE 1000 companies have reaped exceptional results from our financial software systems. Alcoa, Gerber, Pillsbury, Sherwin-Williams, Merrill Lynch, Bankers' Trust, Bristol-Myers, Federal Express, Litton, Lloyd's Bank; The New York Times Company, Owens-Corning, Royal Business Machines, Warner-Lambert and hundreds more have opted for Data Design over other major vendors. Write for our complete customer list and ask *anyone* on it about our fast, trouble-free implementation; system flexibility and ease of use; in-depth training and responsive, knowledgeable support; *management level* people in customer service positions, and more.

You'll find that people who want financial software relief choose Data Design. Since 1973, nationally recognized independent software surveys have confirmed Data Design's unsurpassed record of user satisfaction—year after year. That's why we'll give you a complete customer list—and *they* won't.

So, if you're in the process of looking at mainframe financial software for your company, put Data Design on your list. Then tell the other vendors on it you're also looking at Data Design. And watch what happens.

Financial software by Data Design.
Simply the best.

GENERAL LEDGER
ACCOUNTS PAYABLE
PURCHASE ORDER CONTROL
FIXED ASSETS
CAPITAL PROJECT MANAGEMENT

Learn more about the best financial software available, call Betty Fulton toll-free at 800-556-5511 today.

DATA DESIGN ASSOCIATES

Excellence in financial software. By design.

1279 Oakmead Parkway, Sunnyvale, CA 94086

Micom Systems, Inc. has introduced the **Instanet6000 Series 20** data private branch exchange.

Using twisted-pair wiring, it serves up to 250 channels with simultaneous data transmission at rates up to 19.2K bit/sec.

The data private branch exchange allows terminal and personal computer users to access one or more minicomputers without direct wiring to each resource.

The Instanet6000 Series 20 costs $44,500 for a 34-channel unit. A fully expanded 250-channel system costs $77 per channel.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 91311.

Multiplexers/Modems

Canoga-Perkins has announced the 3272 18 to 144 **channel fiber optic multiplexer**.

Designed for point-to-point local data communication applications, the multiplexer is said to handle asynchronous and synchronous speeds up to 76.8K bit/sec. It features standard SMA connectors and diagnostic capacities.

Other features include stand-alone or rack-mounted versions and full duplex operation.

Units range in price from $2,350 to $5,350.

Canoga-Perkins, 6635 Independence Ave., Canoga Park, Calif. 91303.

■

Canoga-Perkins has announced the **Model 3248,** a fiber-optic T1 multiplexer.

The 3248 can reportedly replace up to eight local T1 links. The 3248 comes with a choice of two interfaces: T1 or V.35. The T1 interface is compatible with standard AMI or B8ZS coding and utilizes DB-15 connectors.

The V.35 interface features both external and internal clocking.

The 3248 provides local and remote loopback tests. It can be installed in stand-alone or rack-mounted versions, according to the vendor.

The 3248 costs from $3,000 to $4,500.

Canoga-Perkins, 6635 Independence Ave., Canoga Park, Calif. 91303.

■

Racal-Vadic, Inc. has introduced the **VA4891**, a synchronous, 4.8K bit/sec. rack-mounted modem designed for use with the MDS-II Network Management System in two-wire dial-up or four-wire leased line applications.

The modem is AT&T 208 and V.27 compatible, provides autodialing and utilizes the capabilities of the MDS-II System Controller, including monitoring and reporting of telephone line impairments.

Each MDS-II chassis can accommodate up to 16 VA4891 modems.

The VA4891 costs $1,395.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

■

Racal-Vadic, Inc. has announced the **7556 Synchronous Multiplexer** designed for use on 56K-byte Dataphone Digital Services (DDS) circuits.

The six-channel multiplexer is available with or without an integral DSU/CSU. All six channels are protocol independent. With the DSU/CSU, the multiplexer is equipped with a modular connector; the 7556 without DSU is equipped with a V.35 interface.

The 7556 costs $1,495. With the DSU, it costs $1,990.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

■

Equinox Systems, Inc. has announced the **Interswitch multiplexer boards**, T1- and CCITT-compatible integral multiplexers, for use with its data private branch exchanges.

The plug-in boards are said to tie several Equinox data private branch exchanges together, either locally in campus environments or remotely in different cities using telecommunications T-carrier facilities.

The T1 multiplexer board provides 144 connections and operates at 1.544M bit/sec. The CCITT-compatible multiplexer board conforms to the European G703 specification, provides 180 connections and operates at 2.048M bit/sec.

The boards cost $5,000 each.

Equinox, 12041 S.W. 144th St., Miami, Fla. 33186.

■

Cable & Wireless Carterfone has added the **Adcomm Plus** to its Adcomm H series of interactive, asynchronous modem/multiplexers.

The Adcomm Plus, said to provide up to 19.2K bit/sec. throughput, adds the capability to communicate in originate and answer modes.

Two versions are available. The Adcomm Plus-1 is priced at $1,695. The Adcomm Plus-2, which provides an independent statistically multiplexed printer channel, costs $1,995.

Cable & Wireless Carterfone, 1341 W. Mockingbird Lane, West Tower, Dallas, Texas 75247.

■

Able Computer has announced **Mux Master Multicluster,** a Digital Equipment Corp.-compatible multiplexing system.

The Mux Master Multicluster is said to permit up to 128 user lines to be terminated in a rack-mountable housing only 17½-in. high by 19-in. wide by 10-in. deep.

The concentrated lines are connected to a DEC VAX or Microvax II host computer via a single twisted-pair link cable.

Life-sized

COBOL

SORT 10,000 100-byte records in 43 seconds.

Load 10,000 100-byte keyed records in 36 seconds.

Compile a 10,000 line program in 76 seconds.

Search a 10,000 line source file in 16 seconds.

Hundred-line COBOL programs are common in benchmark tests. In real life, you deal in thousands of lines. So does REALIA.

REALIA is the fastest micro COBOL. It can handle the biggest files. But speed and capacity are only the basics. The compiler, GSA-certified at the high level, offers IBM VS COBOL compatibility and supports ANSI 85 features, such as inline PERFORM and END-IF.

COBOL programs can call DOS, C, and assembler subroutines, as well as accessing BIOS functions via the machine-level interface. The indexed file system handles multiple alternate indexes, with a maximum record size of 32Kb. The interactive symbolic debugger works on your native generated code, instead of requiring an interpreted version. The full-screen editor imposes no limits on file size.

The programs you write are yours to distribute: REALIA charges no run-time or royalty fee.

REALIA gives you the tools you need for real-life development and maintenance projects. Fast, high-quality phone support. Automatic shipment of upgrades, free for the first year. An introduction to the independent REALIA User Group. A 30-day evaluation copy, for qualified companies. Call us.

Get Realistic about COBOL.

See us at INFO 86!
New York, Oct. 6-9, Booth 659

$995 includes the compiler, Interactive symbolic debugger, editor, and a year of free upgrades and support. Visa / MasterCard / American Express accepted.

REALIA™ COBOL requires MS-DOS™ 2.00 or above; an IBM PC™ PC-XT™, PC-AT™, 3270 PC™, or compatible; and at least 160Kb of memory.

REALIA™ inc.

10 South Riverside Plaza
Chicago, Illinois 60606
(312) 346-0642
Telex 332979 REALIA INC.

Multicluster is configured with up to eight cluster controller boards, each supporting 16 users.

Multicluster costs $500 in addition to the Mux Master configuration.

Able Computer, 300 Airway Ave., Costa Mesa, Calif. 92626.

■

Micom Systems, Inc. has unveiled the **Box Type T** and **Box Type 4** time-division multiplexers, said to multiplex up to eight synchronous data lines over a single wideband composite link at speeds up to 72K bit/sec.

The Box Type T offers wideband synchronous time division multiplexing alone, and the Box Type 4 also offers asynchronous statistical multiplexing.

All channels are full-duplex and can be individually programmed.

Micom Box Type T is priced from $1,695, and the Box Type 4 costs from $2,695.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 91311.

■

Racal-Vadic, Inc. has announced the **4850P** 4.8K bit/sec. synchronous modem with a multiprotocol autodialer.

The modem provides Bell 208 and CCITT V.27 compatibility, four integral automatic dialers and upgradability to 9.6K bit/sec, according to the vendor.

The automatic dialer reportedly supports 801-type parallel automatic calling and IBM 3270 Synchronous Data Link Control, HDLC and 3780 bisynchronous serial dialing protocols.

The 4850PA costs $1,295.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

Local-area networks

Cross Information Co. has announced **Cross/Point-LAN,** a version of its Cross/Point conferencing system.

The product provides electronic mail, conferencing, bulletin board and memo networking in a Novell, Inc. local-area network or Novell-compatible environments. Cross/Point is written in C for Microsoft Corp. MS-DOS and IBM PC-DOS, many C compilers and Unix operating environments.

Cross/Point-LAN is priced at $695 per site.

Cross Information Co., Suite 311, 1881 9th St., Boulder, Colo. 80302.

■

Sercon Corp. has announced the **Bankon EFT Switch** for the banking industry.

The switch is said to operate under IBM's CICS/VS teleprocessor monitor. According to the vendor, it provides banks with the ability to offer regional switching among banks. Features supported include 24-hour availability for message routing, on-line network control and network monitoring, resettlement reporting between local and remote centers, fee calculation, automatic reversal generation and debit/credit card support.

The Bankon EFT Switch is priced from $150,000 to $250,000.

Sercon, 4611 N. Lindhurst, Dallas, Texas 75229.

■

Summation, Inc. has announced its **Sigmanet** product line, said to bring networking capabilities to custom automatic test equipment (ATE) systems.

A Sigmanet station consists of custom ATE hardware, the vendor's Testwindows 2.0 software and the Digital Equipment Corp. Vaxmate. Features include turnkey networking using thinwire Ethernet, automatic file transfers between DOS and DEC systems, statistics for total quality control programs, centralized data analysis and test program revision control.

Sigmanet programming stations are priced from $10,000.

Summation, 11335 N.E. 122 Way, Kirkland, Wash. 98034.

Oh, the joys of being a DP professional.

Every job has its share of problems. But DP professionals seem to be blessed with more than their fair share.

We can help you do away with some of the grief and hassle. Things such as JCL errors, production foul-ups, and maintenance problems.

Our JCLCHECK™ program spells "relief" from JCL problems. It catches all JCL errors, gives you complete, on-line error validation and concise diagnostics. Plus full documentation on a job stream, or entire production system, suitable for insertion in the run book.

Our ProDict™ program is the instant remedy for production headaches. It's an automatic, on-line dictionary of all your production jobs, data sets and programs, that can save you the hours, days, even weeks now spent manually searching listings. It makes possible better scheduling, reliable contingency planning, and faster disaster recovery.

Our PerFix™ family makes current programming less of a pain to maintain. PerFix is our ever-growing, professional's package of maintenance tools to quickly, easily make every "fix" a perfect one. Programs to readily identify execution flow, make complete file comparisons, eliminate the guesswork in program testing. And more.

For all the details on JCLCHECK, ProDict, and the PerFix family, send the coupon, or call us at (408) 554-8121.

We'll deliver fast, long-lasting satisfaction.

© 1986 Triangle Software Company
JCLCHECK, ProDict and PerFix are trademarks of Triangle Software Company.

Send me more about:
☐ the JCLCHECK program
☐ the ProDict program
☐ the PerFix family
☐ Have your representative call me.

NAME__________
TITLE__________
COMPANY__________
ADDRESS__________
CITY, STATE, ZIP__________
PHONE__________
OPERATING SYSTEM__________

Triangle Software Company
4340 Stevens Creek Blvd., Suite 275
San Jose, CA 95129

TRACE your **CICS** programs **ONLINE** as they execute with TRACER from Data Tools. For info call (215) 444-4503.

NEW PRODUCTS/COMMUNICATIONS

Intermec Corp. has announced the **9191 Satellite Wand Station** for use with two of the company's bar code readers.

The 9191 Satellite Wand Station and wand are both said to provide a means of bringing a data entry station to every person, according to the vendor.

Up to 10 units can be used with just one of the bar code readers.

A series of 9191s can be networked in a daisychain, the vendor said.

The 9191 Satellite Wand Station and wand cost $364.

Intermec Corp., P.O. Box 360602, 4405 Russell Road, Lynwood, Wash. 98046.

■

Telebyte Technology has upgraded its **Netscope** 5-in. CRT-based data line monitor.

Added features include IBM Synchronous Data Link Control and CCITT X.25 communications protocols, intelligent decoding to level 2 of these protocols and visual monitor output, according to the vendor.

The CRT display is presented in a split-screen, full-duplex, time-correlated format, the vendor said.

Netscope is priced at $1,800.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

SYSTEMS & PERIPHERALS

Processors

Clearpoint, Inc. has announced the **DNXRAM** family of add-in memories for the Apollo Computer Corp. DN 3000 series of computer workstations.

The single-card memories are available with 1M- or 2M-byte capacities, according to the vendor.

The access time is 120 nsec. The boards use zigzag, in-line, packaged 256K-byte dynamic random-access memories.

The 1M-byte card costs $750 and the 2M-byte card costs $1,495, the vendor said.

Clearpoint, 99 South St., Hopkinton, Mass. 01748.

■

Clearpoint, Inc. has introduced the **RTRAM/4**, offering 4M-byte capacity, and the **RTRAM/8**, offering 8M-byte capacity, for the IBM RT Personal Computer.

The memories support both the RT PC Error Detection and Correction logic, according to the vendor.

Each board is organized as two 40-bit arrays to allow interleaved operation. The boards have access times of 150 nsec, the vendor said.

The RTRAM/4 costs $1,895, and the RTRAM/8 costs $4,395.

Clearpoint, 99 South St., Hopkinton, Mass. 01748.

Graphics systems

Advanced Electronics Design, Inc. has announced the **Colorware Cards Graphics Display Systems** for Q-bus and VMEbus environments.

The systems feature display list processing, an internal window management system, multiple concurrent text and graphics windows, according to the vendor.

Features include a two-board set featuring 1,280- by 1,024-pixel resolution and four or eight planes offering 16 or 256 simultaneously displayable colors.

The 1280Q-GDS designed for the Q-bus costs $5,495 for a four-plane model and $6,495 for an eight-plane model, the vendor said.

The 1280V-GDS for the VMEbus costs $6,795 for the four-plane version and $7,995 for the nine-plane version.

Advanced Electronics Design, 440 Potrero Ave., Sunnyvale, Calif. 94086.

■

Gespac, Inc. has announced the **Gesvig-4**, a graphics controller built on a single-height eurocard and compatible with the G-64 bus.

The controller is said to be fully programmable and can display up to 640 by 640 pixels on a noninterlaced screen. It allows up to 256 colors out of a palette of 262,144 to be simultaneously displayed.

The board can also handle functions such a sector and circle drawing, pattern fill and zooming, according to the vendor.

The Gesvig-4 is priced at $1,250.

Gespac, 100 W. Hoover Ave., Mesa, Ariz. 85202.

Data storage

Telebyte Technology, Inc. has unveiled its **Packetape**, RS-232-based ¼-in. cartridge tape drive system.

Packetape reportedly provides storage of up to 67M bytes of formatted data.

It allows data capture for logging, archival storage or other applications from virtually any RS-232 asynchronous data source without software protocol, the vendor said.

Packetape costs $2,990 in desktop enclosure.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

■

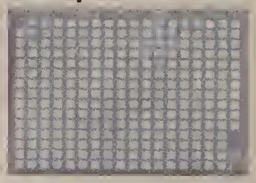
CMS has introduced a 20M-byte, half-height internal hard disk subsystem for the IBM Personal Computer and compatibles called the **K-Kit**.

K-Kit comes complete with controller card, cables and mounting hardware.

The 5¼-in. drive reportedly features an average access time of 80 ms. and a 5M bit/sec. transfer rate.

The K-Kit is priced at $595.

CMS, 3080 Airway, Costa Mesa, Calif. 92626.



COM Print 6000. IT WILL REDUCE YOUR SERVICE BUREAU COSTS TO NOTHING.

If you're using a COM service bureau to reduce costs, we've got a big surprise for you.

Now you can save even more by bringing your microfiche printing in-house. All it takes is the new Bell & Howell COM Print 6000.

It's the first fully integrated fiche print and duplicating system designed specifically for small volume users.

And for small budgets. Because the COM Print 6000 is less than half the cost of any other on-line.COM system.

Its size is also remarkably small. The COM Print 6000 has a footprint of a mere 12 square feet, making it practical for the computer room, remote printing and distributed processing.

Which means you've got your data in all the right places. And the right hands.

Without a lot of hands-on training. In fact, it's easier to operate than an impact printer. So it doesn't require much attention. Or any chemicals. Our advanced dry image technology just gives you clean, high-quality data.

For more input on how the COM Print 6000 can improve your output, call toll free: (800) 556-1234 ext. 218. In California, call (800) 441-2345 ext. 218.

It could mean a big difference in your budget.

BELL + HOWELL
COM Division
16691 Hale Ave., Irvine, CA 92714-5047

Bell + Howell and COM Print 6000 are trademarks of Bell & Howell Company.

Computer Technology, Inc. has announced the **MVM1** memory, an alternative memory designed for Data General Corp. models MV/4000, MV/10000 and S/280.

The MVM1 is available in 2M-, 4M-, 6M- and 8M-byte versions. The use of 256K-byte random-access memory on a six-layer board allows up to 8M bytes of memory per board.

Addressing on the alternative memory can begin on any multiple of 2M bytes in any available memory slot.

Pricing for the 2M-, 4M-, 6M- and 8M-byte memories are $4,800, $7,200, $9,600 and $12,000, respectively.

Computer Technology, Unit B, 1442 W. Collins Ave., Orange, Calif. 92667.

Terminals

Teleprocessing, Inc. has announced the **OIS/VT100 Emulator**, designed to emulate Digital Equipment Corp.'s VT100 terminal for Wang Laboratories, Inc.'s Office Information Systems (OIS) product line.

The emulator is said to allow OIS users to use their workstations to access DEC host computers and other hosts supporting the VT100 terminal and to run DEC applications, such as All-In-1.

The OIS/VT100 Emulator features modem support. Its operational character and user interface follow Office Information Systems standards.

According to the vendor, hardware requirements include Wang OIS 40, 50, 60, 70 or 100 series hardware, at least one OIS-TC or OIS-TC1 telecommunications unit and at least one 64K-byte workstation.

The OIS/VT100 Emulator is priced at $500 for the 40, 50, 60 or 70 series. The 100 or Alliance series is priced at $1,500.

Teleprocessing, 2nd Floor, 120 Fulton St., Boston, Mass. 02109.

Printers/Plotters

Output Technology Corp. has announced the release of its **OT-700b** and **OT-777b** bar-code printers.

Features include five bar-code printers, 200 line/min printing, 8K-byte buffer, dual-mode dot-addressable graphics and front and bottom paper feed.

Other attributes include multipitch printing up to 16.6 char./in., Epson America, Inc. FX and Digital Equipment Corp. LA-120 emulation and parallel and serial ports.

The OT-777b bar-code printer also offers IBM System/34, 36 and 38 compatibility.

Pricing starts at $2,095, according to the vendor.

Output Technology, E. 9922 Montgomery Bay #6, Spokane, Wash. 99206.

■

Calcomp has added the **Models 5723, 5725, 5733, 5735** and **5745** electrostatic plotting systems to its 5700 plotter series.

The self-contained units can accommodate media widths of 24, 36 or 44 inches and produce plots up to 43.52 in. wide and 500 ft long. Resolution of 200 or 400 dot/in. is available.

Features of the latest models of electrostatic plotting systems include a quick-plotting mode and the ability to accept random vector-plot data directly from the host computer.

The Model 5723 is priced at $38,700; the Model 5725 is priced at $43,960; the Model 5733 is priced at $9,210; the Model 5735 is priced at $54,455; and the Model 5745 is priced at $70,455.

Calcomp, P.O. Box 3250, Anaheim, Calif. 92803.

■

General Business Technology, Inc. has announced the **GBT Baby/Laser Printers** for IBM System/34, 36 and 38 computers.

The printers provide 8 page per minute printing. The printers attach to the IBM system via twinaxial cable.

Prices for the GBT Baby/Laser Printers range from $4,495 to $6,495.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714.

■

C. Itoh Electronics, Inc. has announced the **CIE 3000 S** ion-deposition printer.

The printer features Diablo Systems, Inc. 630 emulation, a Motorola, Inc. 68000-based controller with up to 6.5M bytes of random-access memory and a 30 page/min print speed. Up to 32 different fonts can be loaded into memory.

The Dutch 801 in 10- and 7-point fonts and Swiss 721 in 9- and 6-point fonts are standard. The printer can reportedly provide vector and bit-mapped graphics and also has a forms overlay capability.

The CIE 3000 S is priced from $17,000 to $20,000.

C. Itoh, 2515 McCabe Way, Irvine, Calif. 92714.

■

Iris Graphics, Inc. has announced the release of its **2024 Color Ink Jet** printer.

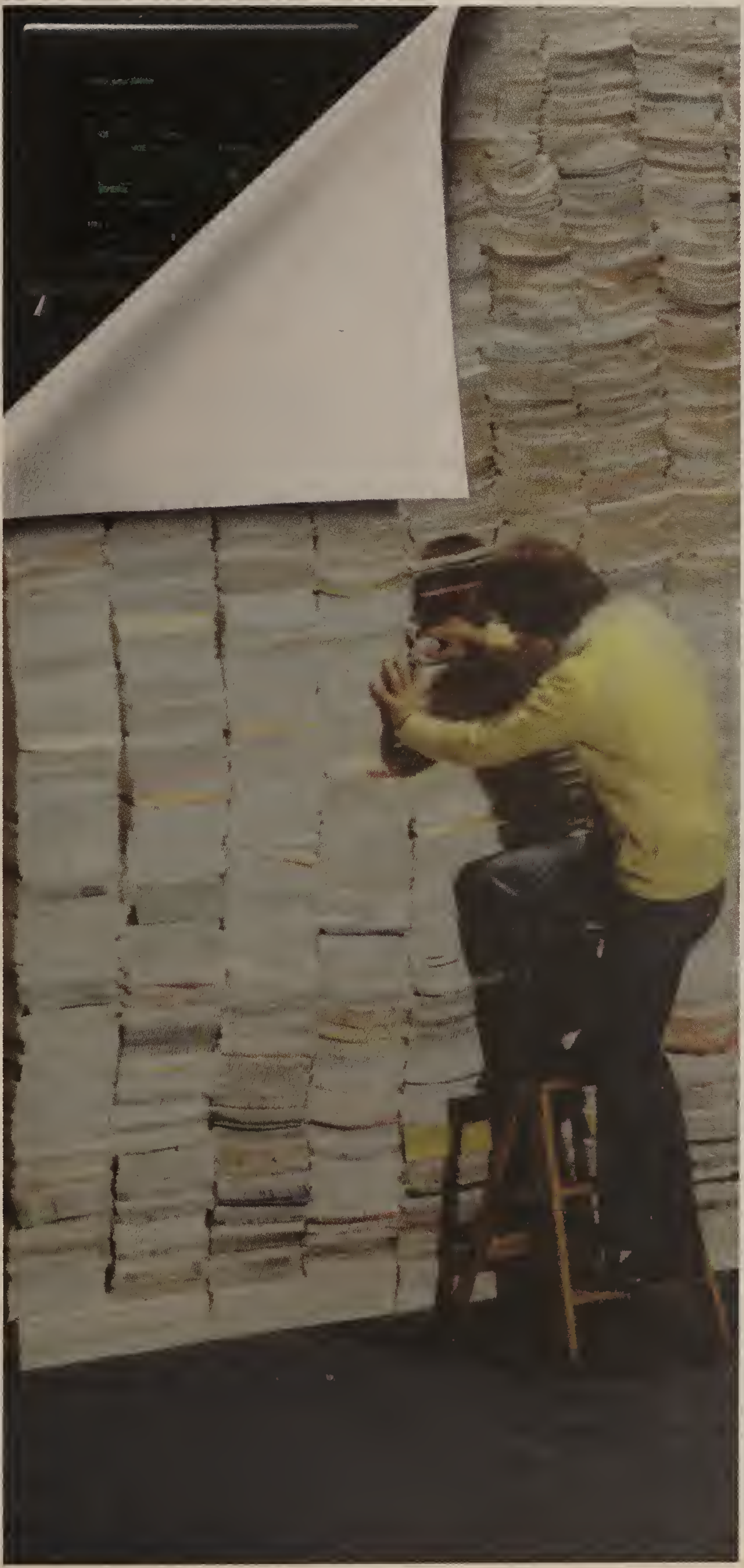
The printer is said to produce full-color 18- by 24-in. proofs in about 12 minutes.

Features include filmless imaging and 240 dot/in. horizontal and vertical resolution.

According to the vendor, other attributes include absolute dimensional accuracy of images and over 250,000 color shades.

The 2024 Color Ink Jet printer is priced at $75,000.

Iris Graphics, P.O. Box 508, 41 Elm St., Stoneham, Mass. 02180.



How Do You Handle Information Retrieval?

SEARCH Software Instantly Finds What You Need

Capitalize on the power and sophistication of BRS/SEARCH®—the software that runs one of the world's largest online database services—to cut your textual information management challenge down to size.

Regardless of length or format, SEARCH stores your data in its original form, indexing every single word for later reference. You can instantly retrieve and display documents containing specific words—in any conceivable logical, positional or numeric relationship—simply by entering them on your keyboard. In seconds, out of millions of records, SEARCH pinpoints the precise information you need.

For optimal flexibility and total interface throughout your organization, SEARCH is available in micro, mini and mainframe versions—all utilizing the same versatile command structure. Take the rummage out of inefficient information retrieval. Call this toll-free number for full details on BRS/SEARCH today: 800-235-1209 (in NY State and outside the continental United States, call 518-783-1161).

BRS INFORMATION TECHNOLOGIES™

1200 Route 7
Latham, NY 12110
TWX 710 444 4965

® Registered Trademark of BRS Information Technologies.
™ Trademark of BRS Information Technologies.

Advanced Computer Communications has introduced the **LPI 690 Model 2,** a laser printer interface designed to be used with the 4050 and 4060 EPS laser printers from Xerox Corp.

According to the vendor, the LPI 690 Model 2 allows Digital Equipment Corp. VAX computers to operate the Xerox printers.

The LPI 690 Model 2 includes host symbiont and driver software.

Advanced Computer Communications LPI 690 Model 2 is priced at $10,000.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

Power supplies

Isoreg Corp. has introduced the **PMW series** of single-phase, continuous, on-line, pulse-width, modulation- controlled Isoguard uninterruptible power systems.

The PMW series features dual-microprocessor supervision and 20-Khz pulse-width modulation control at the output power. It is available in 500-vA and 1,000-vA power ratings. Features include continuous self-diagnostics, electronic and manual bypass switches, circuit breaker protection and multiple outlet sockets.

The 500-vA model costs $1,495 and the 1000-vA model costs $1,995.

Isoreg, P.O. Box 486, Littleton, Mass. 01460.

■

Datapower, Inc. has announced a single-output series of modular ultra-high-power switching power supplies called the **DP-7.5K/DP-20K.**

The DP-7.5K/DP-20K series comes in 750-, 1,000-, 1,500- and 2,000-watt output versions and three case configurations.

According to the vendor, prices for the series range from $650 for the 750-watt unit to $1,500 for a 2,000-watt model.

Datapower, 3328 W. First St., Santa Ana, Calif. 92703.

PRICE REDUCTIONS

Conographic Corp. has announced a reduction in the price of its **Cono-Color 40** graphics adapter.

The Cono-Color 40 is said to be an IBM-compatible graphics board for use in applications such as Autodesk, Inc.'s Autocad, Micro Control's Cadkey, T&W Systems, Inc.'s Versacad and Personal Cad Systems, Inc.'s P-Cad.

Attributes of the graphics adapter include resolution up to 640 by 400 and 512 by 512 pixels, 16 on-screen colors at any resolution and analog and digital compatibility.

According to the vendor, the board is now priced at $695.

Conographic, 17841 Fitch, Irvine, Calif. 92714.

■

Apple Computer, Inc. has announced price reductions for its personal computer family and **Laserwriter** printer.

The Macintosh Plus is now priced at $2,199, and the Macintosh 512K Enhanced is priced at $1,699, according to the vendor.

The Laserwriter printer is priced at $4,999.

Apple Computer, 20525 Mariani Ave., Cupertino, Calif. 95014.

■

Tektronix, Inc. has announced price reductions for its **4120 series Graphics Workstations.**

The 4120 series of Graphics Workstations is composed of the 4125, 4128 and 4129 systems.

Base prices now range from $16,950 to $29,950.

According to the vendor, prices on options and upgrade kits have also been reduced.

Tektronix, P.O. Box 1000, Wilsonville, Ore. 97070.

■

Micom-Interlan, Inc. has reduced the prices of its Ethernet controllers for personal computer local-area networks.

The NI5010 PC Ethernet controller, which provides a link-level connection between any IBM Personal Computer, Personal Computer XT or Personal Computer AT and an Ethernet, is now priced at $595 with on-board transceiver and $495 without the transceiver.

The NP600 PC Ethernet controller, which handles Transmission Control Protocol/Internet Protocol processing for the Personal Computer AT, is now priced at $895.

Micom-Interlan, 155 Swanson Road, Boxboro, Mass. 01719.

■

The Yourdon Division of DeVry Inc. has announced a price reduction for its **Analyst/Designer Toolkit** for the IBM Personal Computer family.

The toolkit supports Yourdon's Structured Techniques for defining the requirements and designs for computer software and includes features for creating the diagrams associated with structured analysis and design.

The Analyst/Designer Toolkit is now priced at $1,995.

Yourdon, 1501 Broadway, New York, N.Y. 10036.

■

Optotech, Inc. has reduced the price of its 200M-byte optical disk cartridge.

The single-sided write-once disks provide permanent, transportable data and image storage for users of 5¼-in. optical disk drives. The 200M byte disks are now priced at $125.

Optotech, Suite 104, 740 Wooten Rd., Colorado Springs, Colo. 80915.

OUR AIM IS PERFORMANCE

The AIM Benchmarks™ are industry standards for UNIX™ system measurement. But measuring system performance is only part of the answer. The complete answer is UNIX system performance software for system measurement, management and improvement.

Our new products, AIM Job Accounting™ and AIM Disk Tuner,™ are system management and improvement tools. And more products are on the way.

AIM Technology is the leader in providing software products for UNIX system performance

UNIX system performance/capacity planning is an important issue with serious UNIX systems users. Through market research studies, AIM identifies performance needs and provides software to satisfy them.

Contact AIM today for the UNIX system software you need to:

- **Measure Performance**
- **Purchase Knowledgeably**
- **Maintain Standards**
- **Improve Performance**
- **Increase Cost-Effectiveness**
- **Monitor Resource Usage**
- **Manage System Resources**

AIM TECHNOLOGY
3350 West Bayshore Road, Suite 203
Palo Alto, CA 94303
(415) 856 UNIX

AIM Benchmarks™ AIM Job Accounting™ and AIM Disk Tuner™ are trademarks of AIM TECHNOLOGY
UNIX™ is a trademark of AT&T Bell Laboratories

COMPUTER INDUSTRY

Section begins on page 142

Michels sees evolving niche for ‘personal supercomputer’

Convergent cofounder tackles another start-up

By Maura McEnaney

To many in the computer industry, Allen Michels is the epitome of a confident Silicon Valley entrepreneur. After founding Convergent Technologies, Inc. in 1979, Michels and three other Convergent executives left the company in 1985 to form The Dana Group in Sunnyvale, Calif.

Soon to be known as Dana Computer, Inc., the company is developing what it calls a "personal supercomputer" — a Unix-based, reduced instruction set machine that executes between 20 million and 30 million instructions per second (MIPS). The computer, code-named Titan, is targeted for second-quarter 1987 introduction with a price tag of between $50,000 and $70,000.

Since its first official gathering in cofounder Ben Wegbreit's home on Dana Street in Palo Alto, Calif., last year, The Dana Group has raised $11 million in seed money from about 12 different venture capital firms. The firm's roster of 45 employees has some of the industry's top scientists.

Dana executives include Bill Worley, co-designer of Hewlett-Packard Co.'s Spectrum line of computers, and Steven Johnson, author of the C compiler for AT&T's Unix system. Michels was recently interviewed at his Dana Group office.

The Dana Group's Allen Michels, relaxing at home with Max.

CW: What exactly is a personal supercomputer?

MICHELS: It's a computer with supercomputer-level performance but dedicated to a single user. It has lots of MIPS and megaflops with floating-point capability. In this case, it's a machine that will provide anywhere from 20 to 30 MIPS of scalar processing and 48 Mflops peak of floating-point processing. This machine will not only provide supercomputer performance but also very high resolution graphics.

CW: Where do you see it being used?

MICHELS: We see it being used in the next generation of engineering design applications, such as three-dimensional solids modeling. Another application will be for serious engineering analysis applications — machines at the single-engineer or small engineering department level — for studies in stress mechanics, fluid dynamics and structural analysis. In the scientific area, the machine is especially interesting because simulation is being looked upon as an acceptable way of doing science.

CW: What is missing from this market now?

MICHELS: There are machines in the market that do the job very well. However, the principal issue is the cost of acquiring the equipment needed to do the job. The kind of system that we're talking about delivering for $70,000 to $80,000 today costs between $400,000 and $500,000.

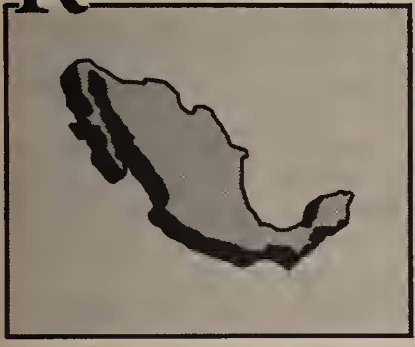
CW: How is a start-up today different from what it was seven years ago when you started Convergent?

MICHELS: I think that's like asking parents how their children are different. If you subscribe to the idea that a parent would say each of his children is unique, then how could you say otherwise for institutions that constitute groups of different people?

I think that all companies, whether they were formed five years ago or today, go through a type of natural birth, where there is an immediate instant struggle for survival. They all have a culture that is focused primarily on making the best available use

See **MICHELS** page 116

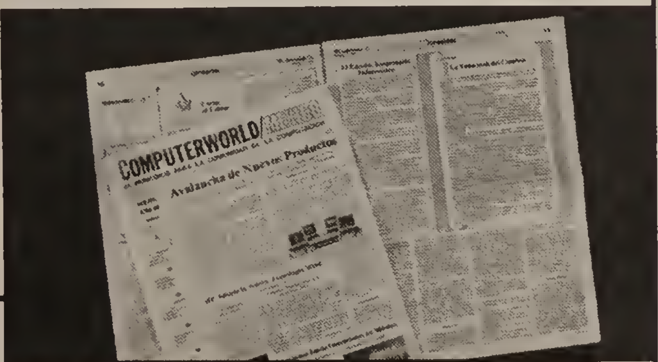
REACH MEXICO'S INDUSTRY LEADERS. ADVERTISE IN COMPUTER-WORLD/ MEXICO.



Advertise in *Computerworld/Mexico* and sell your products directly to Mexico's burgeoning computer community. According to International Data Corporation, the world's leading market analysis and consulting firm for the information processing industry, there are over 21,000 computer sites in Mexico.

Over 10,000 MIS/DP professionals in government, banking and industry read *Computerworld/Mexico*. Modeled after *Computerworld*, its sister publication in the U.S., *Computerworld/Mexico* is considered an excellent way for advertisers to reach a broad range of influential industry leaders. Twice each month, *Computerworld/Mexico* reports developments in hardware, software and terminals as well as industry trends.

CW International Marketing Services makes advertising your products in Mexico and around the world, easy. We have over 55 publications in more than 25 countries around the world. For more information on our wide range of services, complete the coupon below and mail today.



CW COMMUNICATIONS/INC.
Frank Cutitta
Managing Director
International Marketing Services
CW Communications/Inc.
375 Cochituate Road
Framingham, MA 01701-9171

Please send me more information on:
☐ *Computerworld/Mexico*
☐ Your other foreign publications
☐ Your brochure "The Computer Marketplace in Mexico"

Name ______
Title ______
Company ______
Address ______
City ______ State ______ Zip ______

Introducing:

VM Level

***The ANSWER* for automatic VM Resource Management.**

- Automatically adjusts key VM control indicators.
- Provides automatic resource leveling during peak capacity.
- Improves VM users response time.
- Controls excessive resource utilization.
- Provides high efficiency monitoring with little CPU overhead.
- Monitors usage of CPU, Memory, and I/O utilization.
- Requires no VM modifications.
- **Free evaluation period.**

Challenge us!
STAR

Software Technologies
and Research, Inc.
160 West Street Cromwell, CT 06416-1930
In CT 203-529-7128 **1-800-258-STAR**

On·Line Software supports your office communications.

I·N·T·R·O·D·U·C·I·N·G
BULLETIN™
The Electronic Mail System

Untangling software program copyright laws

OUTSIDE LINES
L.J. Kutten

Many software developers put a copyright notice on programs they actually want to protect as a trade secret. This is dangerous. While it does not automatically remove the possibility of trade secret protection, such action is ill-advised.

The major problem is that this action raises the question of whether the developer was actually seeking trade secret or copyright protection. As a result, the developer may find infringement settlement claims less quickly resolved. This happens because a question of fact can only be decided by a jury, rather than just a judge.

Two prime examples of this type of problem are *Management Science America, Inc.* v. *Cyborg Systems, Inc.* (1978) and *Technicon Medical Information Systems Corp.* v. *Green Bay Packaging, Inc.* (1980).

In *Management Science* v. *Cyborg*, the plaintiff licensed a computer program to more than 600 users under a trade secret agreement. However, the documentation had a copyright notice. When the plaintiff sued for trade secret infringement, the defendants asked the judge to summarily dismiss the claim.

It was argued that distribution to more than 600 customers constituted a general publication under copyright law, which destroyed the program's claimed trade secret status. It was also argued that distribution with the copyright notice meant the developer was barred from denying it had sought to use copyright protection.

The court refused to issue the summary judgment. It went on to state that the defense hinged on the factual determination of whether distribution to customers was actually publication. If such distribution did constitute publication, trade secrecy was destroyed.

A similar decision was reached in *Technicon* v. *Green*. In that case, the developer placed a copyright notice on its proprietary reference manuals. When it sued the defendant for infringement, the defendant also asked for a summary judgment using the same argument as in Management Science's case. Namely, the plaintiff could not claim the manuals were a trade secret, since they had been distributed with a copyright notice.

The court refused, stating, "This court is not willing to conclude that, as a matter of law, the mere fact of affixing a copyright notice to the [software] manuals voids any claim of secrecy under Wisconsin's Trade Secret Law.

"In short, a genuine issue of fact exists as to whether or not the matters sought to be protected . . . remain a secret or were, in fact, published by means of the distribution which took place and the affixation of the statutory notice of copyright."

In essence, both courts neither ruled that trade secret protection had been stripped away, nor been controlled. Instead, they said the question of whether the trade secret claim was preempted by the use of a copyright notice was a factual question they could not decide. Rather, it was a question that only a jury could answer.

Kutten is a member of the Missouri and Illinois bars. His book, Protecting Computer Software: Law and Forms, *will be published later this year by Kluwer Law Book Co.*

Michels sees evolving niche

From page 115

of every moment to gain strength.

All of these companies must have at their roots a culture of agility, efficiency, productivity and a very high level of focus which ensures that every available resource is always focused on the objective. And what's necessary underneath all that is endurance, discipline and commitment.

CW: What's been the most important aspect of the project for you so far?
MICHELS: The speed at which things have happened has been gratifying, but even more important is the world-class group of computer scientists we have put together. With Bill Worley, Steve Johnson, Randy Allen [his research was included in IBM's decision to vectorize Fortran compilers on the 3090], John Reiser, [who did the first Unix port to a Digital Equipment Corp. VAX computer] and Glen Miranker [former director of engineering at Valid Logic, Inc.], we have some of the most brilliant computer scientists in the industry.

CW: How do you lure people like that from a stable, secure environment into a risky start-up?
MICHELS: I think it's the challenging work. It's the excitement of working with a set of collaborators on a project of intense technical interest and with a very strong commercial appeal.

CW: But the industry has changed considerably. Hasn't that made a difference in your ability to attract talent?
MICHELS: As is the case with venture capitalists, so it is with people who will join young ventures. They have a greater degree of discrimination and do a more intense analysis of the situation. They also have a greater need to be persuaded that joining a start-up is the right thing to do.

If there isn't a strong foundation to begin with, if there isn't an inherent and enduring appeal in the people and in the idea, people aren't going to want to join. I think it's essential that the idea be good enough at the inception of the company so that it attracts magnets in the industry — people who by virtue of their reputation attract others who wish to learn.

CW: Venture capital has received a lot of criticism lately. Some people feel they have to give away the store to get the venture money. Did you feel that way at all?
MICHELS: I think that people who make those criticisms are fundamentally idiots. If you travel all around the world, you'll find entrepreneurial technologists are languishing in other countries. They have good ideas, a commitment to work very hard and a willingness to provide sweat equity in astonishing proportions. It's no different than in the United States.

See **MICHELS** page 117

MVS/XA deals catching on

From page 142

jump. Such a "stick" type of approach is likely to follow the "carrot" that the XA Express represents.

MVS/XA's significance as a contributor to IBM's revenue and profits can best be seen from the following example:

MVS/XA, which accounts for only 12.5% of IBM's mainframe software licenses, contributes more than 30% of its software revenue. By year's end, this operating system will represent about a third of IBM's 1986 software revenue.

IBM's DOS migration strategy has been two-pronged. Conversion to MVS/XA is the option that IBM prefers the larger 4300-type customers to choose.

Smaller accounts

Smaller accounts are being encouraged to run DOS under VM. Either way, IBM wins, since the license fees for MVS/XA or VM/XA exceed those of DOS by a considerable margin.

The VM prong of IBM's DOS migration strategy is reflected in the 8.5% annualized growth of the VM installed base in the March through September 1986 period.

That makes VM the fastest growing IBM operating system. The rise in the number of all MVS licenses during the same period was only 2.7%, despite the fast approach of MVS/XA.

Mirror image

The importance of DOS to IBM is almost a mirror image of MVS/XA. DOS accounts for about 36% of all 370-type licenses but only 12.8% of the revenue.

Therefore, just as the increases in the use of MVS/XA and VM operating systems were predictable, so was the decline in the number of DOS licenses.

As of September 1986, an estimated 11,800 were installed in the U.S. — down 1% from six months before. A vast majority of the remaining DOS users, 84.3% to be precise, are the 4300 hardware users.

FILL IN THE BLANKS.

COMPUTERWORLD

Military acts to speed OSI

DOD push for tools to cut costs spurs development

Largest users win Lotus concessions

IBM recovery system delayed

Gates talks. The 386 machines, a new MS-DOS and beyond

Fill in your name and address on the attached order form — and we'll fill you in on every facet of the computer community. The news. The innovations. The trends. All the information you NEED to know.

Don't let pass-along copies make you the last to know. Just fill in the blanks. And we'll fill you in — firsthand.

COMPUTERWORLD

For faster service, call 1-800-544-3712; in PA call collect, 215-768-0388.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55 SOUTHEASTERN, PA 19398

POSTAGE WILL BE PAID BY

CIRCULATION DEPARTMENT
COMPUTERWORLD
P.O. Box 1016
Southeastern, PA 19398-9984

COMPUTER INDUSTRY

Small vendors may be eyeing divestiture

By James A. Martin

NORCROSS, Ga. — Intelligent Systems Corp.'s recent decision to put the entire company up for sale could be the first in a series of such moves by other small computer vendors, according to analysts.

"From now until the end of the year, we could be surprised by the amount of similar announcements," says Samuel E. Navarro, technology analyst with Ladenburg, Thalmann & Co. in New York. "It's simply because present tax laws benefit takeovers before Jan. 1, and many high-tech companies feel their stock market prices are undervalued."

Intelligent Systems, parent company of Quadram Corp., Princeton Graphic Systems, Inc., Intecolor Corp. and other microcomputer enhancement vendors, formally announced earlier this month that it plans to sell all or parts of the company, depending on the offers received [CW, Oct. 6]. The firm confirmed last week it was still negotiating, but would not discuss any details.

However, not all analysts believe Intelligent Systems' announcement is a harbinger of things to come. "The time clock for current tax laws is ticking, and there's not enough time to start from scratch and get a deal done before the end of the year," says David B. Guthrie, analyst with Morgan Keegan, Inc. in Memphis. "So if anyone is thinking about doing something similar, they'll have to come forward quickly."

The announcement was designed to spur investor interest in Intelligent Systems as well as immediately increase the value of its stock, both of which have been accomplished. The day after the announcement, the company's stock rose $2 a share to $7.75; last week, it closed at about $8 a share.

In the dark

Intelligent Systems is closely guarding its talks with potential buyers, and analysts admit they are in the dark about the company's progress to date. "I think there is a good chance that someone will buy the whole company," Navarro says, "but perhaps an even better chance that someone will buy Princeton Graphics or Intecolor, as those have been the most profitable divisions."

There is some disagreement and concern among industry observers that IBM's expected microcomputer, based on the Intel Corp. 80386 microprocessor, might be a "closed box," with little need for add-on memory and graphics boards. If that is true, some analysts say the future of companies like Quadram could be in jeopardy, hurting Intelligent Systems' chances for an easy sell.

"I believe that the standard functions of a PC — the serial and parallel ports, memory, graphics and disk-drive controllers — will be integrated all in the mother board, and that doesn't leave a lot for the add-on people," says Donald Heeter, technology analyst for J. C. Bradford & Co. in Nashville.

Add-on and enhancement companies will continue to remain viable but will have to deal with an increasingly competitive marketplace, Guthrie says. "Unless IBM closes up the architecture on a 386 machine dramatically, which we don't expect, we feel there will always be a market for accessory manufacturers to fill in the void," he adds.

Navarro estimates that Princeton Graphic Systems generates some $50 million in annual sales and Intecolor about $20 million, and that both are money-making operations.

Quadram, perhaps Intelligent Systems' best known division, brings in about $50 million in sales but is barely breaking even or perhaps even losing money, Navarro adds. Intelligent Systems should be worth between $110 million and $115 million, sold either collectively or individually.

Intelligent Systems does not break out sales and income figures for its divisions.

Turns Spaghetti Code COBOL Into Structured COBOL Automatically

SUPERSTRUCTURE takes your unstructured COBOL programs and automatically produces structured COBOL programs that are easy to understand and maintain. SUPERSTRUCTURE provides a simple and cost effective alternative to manually rewriting those unstructured programs that are a maintenance nightmare. Of course you can't believe it. Let us prove SUPERSTRUCTURE works, using your programs at your location. SUPERSTRUCTURE—the breakthrough you've been waiting for. Call today: Marketing Director—SUPERSTRUCTURE.

Group Operations, Incorporated
1110 Vermont Avenue, N.W.
Washington, D.C. 20005
(202) 887-5420

Offices in: Atlanta, Boston, Chicago, Dallas Los Angeles and New York

Michels sees evolving niche

From page 116

But in these other countries, there is no risk money around. There's a very conservative banking mentality everywhere.

In the United States, we're blessed with the capability of being able to go out — a bunch of unknowns, with very limited credentials — and raise millions of dollars.

In the absence of any comparable capability anywhere else in the world, how could you possibly criticize the people who are willing to put hard-earned money at risk with unknowns?

Only in America can you do this and get rich as a result of it, if you are successful.

CW: Is there a way to get rich with venture capitalists still in the picture?

MICHELS: Venture capitalists get rich only if the people with whom they invest are absolutely motivated to do so.

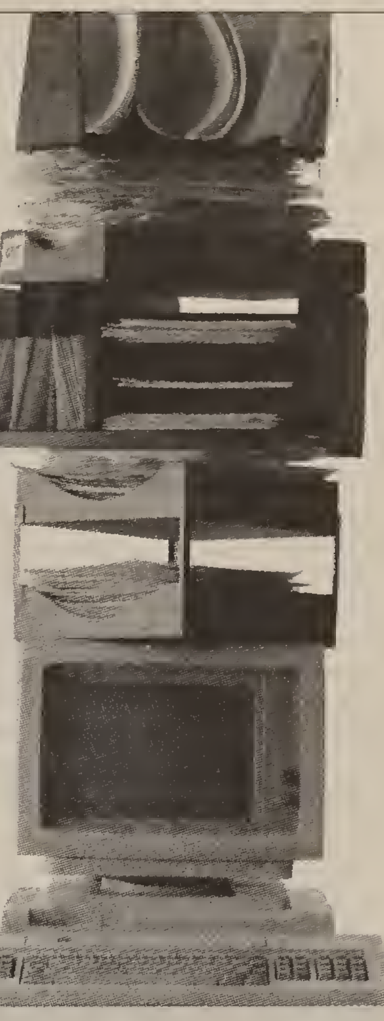
I have never seen greed and avarice among venture capitalists. They all would like to optimize their investments and get the best value for the money.

That's their job.

If I were an investor, I would want that, too.

CW: Are we ever going to hear the true story of your exodus from Convergent?

MICHELS: The true story of the Convergent exodus is that we got a business idea one day and we left the company literally the next day. Just like that.



Even under heavy volume.

Most Electronic Mail Systems buckle under the pressure of a heavy workload. BULLETIN carries the weight. At one installation, BULLETIN handles the communication needs of over 2,000 users.

BULLETIN is easy to use. Because BULLETIN is menu-driven and uses common office terminology, users can create and send messages immediately. BULLETIN simplifies your day-to-day operations with functions such as: Message Creation, Message Tracking, Forms Creation, Calendaring and Scheduling, Filing, Confidentiality and Security. BULLETIN also offers a number of external interfaces including DISOSS* and PROFS.*

Free trial. 'Trial' BULLETIN and see for yourself how it can speed, simplify, and improve your office communications.

Receive more than just (800) hot line support. Once you license BULLETIN, On-Line Software provides free technical training classes. We also provide reliable support through installation, implementation, and maintenance.

Act now and save up to $6,000. By acting before January 16, 1987, OS shops can license BULLETIN at our special introductory price and save $6,000. DOS shops save $4,000. Call or write for more information: On-Line Software International, Inc., Two Executive Drive, Fort Lee, NJ 07024, (201) 592-0009 (In NJ and Canada).

800·526·0272

On·Line
Software
International
Authorities
in IBM*
Software

BULLETIN

The Electronic Mail System

IBM is a registered trademark of International Business Machines. *DISOSS and PROFS are IBM products.

AT&T slowly fading from computer business, analysts say

Communications to remain core business

By Jean S. Bozman

CHICAGO — In the days following the 1983 divestiture of AT&T, industry analysts envisioned a free-for-all with AT&T muscling into IBM's computer territory — and IBM battling for control over the communications networks of large corporations.

That is not quite the way things turned out, according to the Gartner Group, Inc. In the battle for the hearts and souls of MIS managers, the consulting group contended, IBM is clearly ahead.

AT&T has seemingly backed off its computer initiative, Dale Kutnick, the Gartner Group's executive vice-president of research, said at the consulting firm's recent seminar on the future of AT&T. Sales of the company's 3B series of computers have been less than spectacular — and are far less important to AT&T revenues than the sale of bandwidth and private branch exchanges.

"AT&T is backing out of the computer business, slowly," Kutnick said. He noted that AT&T prefers to resell office equipment from Ing. C. Olivetti & Co. — and may one day elect to resell mainframe equipment from Fujitsu Ltd.

Meanwhile, IBM has taken a number of steps to hold on to its mainstay computer business and to add network management products to it as a growth area. Along with its partners, Rolm Corp. and MCI Communications Corp., IBM believes it can present MIS managers with an end-to-end network solution that AT&T cannot.

"The battle," Kutnick said, "will really take place in communications software and network management. That's because IBM doesn't care if you're using leased lines or switched signals, as long as IBM data is going across them."

Michael Schumer, vice-president of the Gartner Group's communications research and consulting group, told the more than 100 attendees that AT&T could expect steady growth from its core businesses of communications services and sales of private branch exchange switches and customer premise equipment.

In 1985, AT&T generated $34.5 billion in revenue, nearly half of it from sales of communications services. Growth will be slow but steady, Schumer said, with 1990 revenue estimated at $38.4 billion, 66% of that from sales of services. By 1995, Schumer said, AT&T should be at the $51.3 billion mark, roughly IBM's size today.

IBM stands to generate more growth in the areas of private branch exchange sales and network management software, Gartner Group analysts said. That sustained growth in PBX sales is expected to benefit AT&T, too — with AT&T doubling its present 24% market share by 1991.

From an MIS perspective, however, the competition is more one-sided. IBM already owns more than 80% of all large commercial mainframe sites. It is in position to build upon that base with strategic networking products.

AT&T, in contrast, provides MIS managers with bandwidth, but that business could easily be fragmented by 1990, as alternate sources of capacity become more widespread.

Perhaps more critically, AT&T lacks many key products that would allow MIS managers to direct a national or international data network.

To grow in the computer business, AT&T has decided to pursue joint ventures with Olivetti Corp., N.V. Philips and Fujitsu Ltd.

IBM, meanwhile, is wasting no time preparing further forays into AT&T territory. IBM is considering several plans to sell T1 multiplexers, Kutnick said.

Bozman is a Computerworld *contributor based in Chicago.*

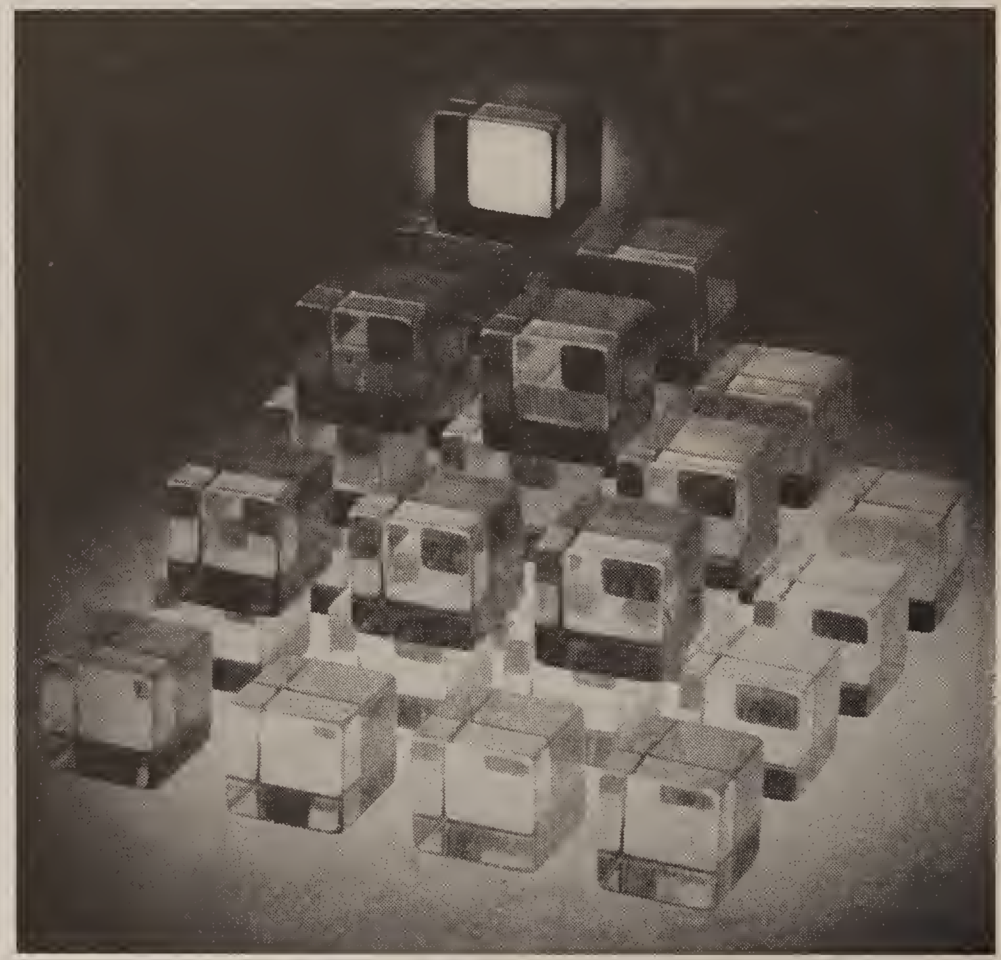
AT&T garners defense contract

WHIPPANY, N.J. — Despite AT&T's recent corporate hints that it may be scaling back its efforts in the computer business, the telecommunications giant was awarded a defense contract last week to develop parallel processing computers.

The three-year, $7.7 million contract from the U.S. Defense Advanced Research Projects Agency calls for scientists at AT&T Bell Laboratories to build a prototype computer for speech and image recognition and complex pattern-matching tasks. The goal is to parallelize those tasks to greatly increase the speed at which computers can recognize large-vocabulary human speech.

AT&T will attempt to extend the Dado parallel processing architecture developed by Fifth Generation Computer Corp. of New York and develop new software. A working prototype is expected by next spring.

Westinghouse
SOFTWARE **SOLUTIONS**



Building a better network . . .

Increasing the productivity of VTAM networks means getting users on line and lined up — with the data, with the application programs, with the jobs that must be done.

Westinghouse Software Solutions is a portfolio of program products that can be used, either separately or concurrently, to increase your systems productivity and effectiveness.

***NCI/XF** (Network Control Interface/ Extended Features) is a network-wide single point entry system. NCI/XF helps VTAM users access applications quickly and easily, while reducing user support requirements and simplifying network administration. NCI/XF also provides message and broadcast capabilities.*

NCI/XF adapts to your installation needs.

- *Customized network entry procedure*
- *Accommodation for network configuration changes*
- *Basic or total network security*

***MULTSESS,** the most efficient multiple session manager available today, orchestrates the complex connections between users and applications for improved productivity and data availability.*

MULTSESS switches a user from one application to another in the time it takes to press a predefined function key, as easily as changing television stations.

With the optional Automated Transaction Processor (ATP), MULTSESS users can get to the working levels of their applications automatically.

MULTSESS provides fast transaction processing with minimal storage requirements. MULTSESS is also a security controller. Access to programs is secured by user or terminal ID. For protection during brief absences, MULTSESS has easy disconnect/reconnect capabilities.

Getting the job done . . .

NCI/XF and MULTSESS are tools to align your network users and their functions for peak effectiveness. The Westinghouse Software Solutions portfolio makes your network an organized, efficient, easily managed data processing resource. Westinghouse Software Solutions makes it easy to get the job done.

You can be sure... if it's Westinghouse

Westinghouse Electric Corporation
P.O. Box 2728
Pittsburgh, PA 15230-2728

Call (412) 256-2900 or
1-800-348-3523

Europe acts on U.S.-Japan chip accord

By Alex Scott

STRASBOURG, France — The European Community (EC) has decided to open formal proceedings against the agreement reached in July between the U.S. and Japan on semiconductor trade. The EC will bring the action under the General Agreement on Tariffs and Trade (GATT).

Announcing the decision here recently, the European Community Commission confirmed that an official request to open consultations over the agreement had been lodged with GATT authorities in Geneva.

According to a statement that was issued by EC Trade Commissioner Willy de Clercq and Industry Commissioner Karl-Heinz Narjes, the U.S.-Japan agreement "contains elements which call into question the rules of international trade and the legitimate interests of the European Community."

EC officials have argued that the U.S. failed to provide the EC with assurances that the agreement would not involve price fixing on the European market or reserve a part of the Japanese market for U.S. semiconductor manufacturers.

> ”
>
> ***According to the latest statistics, U.S. chip makers account for about 10% of the Japanese semiconductor market.***

Officials at the commission referred to a so-called secret clause of the agreement that allegedly refers to a doubling of Japanese semiconductor imports over five years, mainly to the benefit of U.S. producers.

According to the latest statistics, U.S. makers account for about 10% of the Japanese semiconductor market; others, including the EC, account for only 1%.

The statement issued by the commission makes it clear that European industry is largely dependent on imported semiconductors for the moment and that the EC thinks it is "not right that prices in this sector should be set arbitrarily by the U.S. and Japan."

The statement continued, "It would also be unacceptable that U.S. firms should be privileged on the Japanese market. This would constitute, on behalf of the two largest international trading partners, a flagrant and potentially damaging contradiction of the willingness expressed in the GATT talks, held recently in Punta del Este, Uruguay, to liberalize trade for the benefit of the international community."

Scott is a Brussels-based correspondent for the European bureau of the CW Communications International News Service.

MSA reports 25% boost in quarterly revenue

Continues upswing after dismal 1985

By James A. Martin

ATLANTA — Management Science America, Inc. (MSA), continuing on the upswing after a dismal 1985 fiscal year, last week reported a 25% increase in operating revenues for the third quarter. Sales reached $38.8 million, compared with $30.9 million for the same quarter last year.

MSA reported net income of $260,000, or 1 cent per share, compared with a 1985 third-quarter loss of $3.5 million, or 20 cents per share.

The third quarter, however, lagged behind this year's second quarter, when net income was $5.9 million.

Revenue up for '86

For the first nine months of 1986, revenue was $115.8 million, compared with $94 million in 1985. Net income was $5.8 million, against a loss of $3.2 million in the first three quarters last year.

"MSA has definitely regained its footing," said Brian Mutert, software analyst for Robertson, Colman and Stephens in San Francisco.

"But the company has not achieved the level of profitability that one would hope for to improve its near-term investment appeal," Mutert continued.

Aggressive R&D

Much of MSA's earnings are a result of aggressive capitalization and research and development, Mutert said.

"But it will take the company another year of healthy revenue growth to get operating margins back to a strong level," he said.

MSA has embarked upon a busy acquisition campaign to gain a more secure foothold in vertical markets such as education and manufacturing software.

For the long term, this strategy will pay off, according to Mutert.

To Avoid The Hang Ups Of Selling Computer Systems, Talk To Jacore.

In the highly competitive world of computer sales, obstacles like inventory financing, inadequate margins and lack of support can hang even the best sales people out to dry.

At Jacore, we're changing all that.

We're one of AT&T's fastest growing Master VARs — offering turnkey business solutions to today's minicomputer marketplace. Our goal is to continue adding partners to our prestigious nationwide network of quality business organizations. As an agent you will quickly realize the benefits of joining our network. Benefits that can get you off the line. And your cash flow back in line.

The Inventory and Support You Need.
With our complete and up-to-date inventory of AT&T mid-range computers and peripherals, you can install quickly and avoid typical delays. So when it comes to credit or capital, your hands are never tied. We also provide expert support including consulting and problem solving for you and your customers.

The Margin of Difference.
As a large and growing organization, we're able to obtain significant discounts from our supplying vendors. We pass these directly on to you. We also offer unique group insurance programs and educational classes and seminars. All designed to help your bottom line.

Join A Winning Team.
By joining Jacore's AT&T network, you can take advantage of our innovative leasing arrangements, software exchange program and co-op advertising opportunities. Plus you'll have the added confidence of knowing you're part of a leading company.

Talk to Jacore today and join a winning team. Just call Alicia T. Tyler at 1-800-334-9638. And hit the ground running.

Jacore Systems, 1899 Powers Ferry Road, Marietta, Georgia 30067

AT&T
An Authorized Master VAR for AT&T

Jācore Systems
THE Source for Mid-range Computer Systems

BANK OF AMERICA CHEVRON MOTOROLA, INC. WESTINGHOUSE DEFENSE &
GOLDKIST INC. FOXBORO CO. APPLE COMPUTERS FORD AEROSPACE DHL W
CONTROL DATA CORP. HERMAN MILLER, INC. THE STOUFFER CORP. COMPUTE
AEROPORTS DE PARIS NEODATA SERVICES LSI LOGIC QUESTAR SERVICES COR
CENTRAL N.E. COLLEGE GPA (GROUPE DES POPULAIRES D'ASSURANCES) TECH
CROCKER BANK SOFRESID FEDERAL HOME LOAN BANKS MONOLITHIC MEM
STANFORD LINEAR ACCELERATOR CENTER CENTRE D'AUTOMATISATION POU
ASPEN SYSTEMS, INC. FINANCIAL TECHNOLOGIES, INC. PLANNING RESEARCH
HO N CHRONI OUTHE UNIVER OMPAGNIE
REA BATES NIV RI M ILE BANK
MIC STATE U RSIT RTHWES NA IFE RIC
WIL TING OS TON UNIVER TI SITY C
BER R ND EF INEERS HAW C ON T L
CHI N TTE I INC. MANAGE I NG SE
APP OMI S SPACE DHL W E S ST
THE UFFE V RVISION HA N CO N I
LSI QUE TC RPORATIO HE ANY
TEC AL ECO SER BELIN GR CS RD I
RAY A CORPO FIR RVICE ANF EAR
VER CRAWF COMPA IA POW OMPA PRING
GEORGIA POWER COMPANY SPRINGS INDUSTRIES, INC. RHONE-POULENC IN
EDMONTON PUBLIC SCHOOLS TOTAL COMPAGNIE FRANCAISE DES PETROLES
HOUSTON CHRONICLE SOUTHERN ILLINOIS UNIVERSITY COMPAGNIE GENER
CRAWFORD & COMPANY READING & BATES THE UNIVERSITY OF MISSOURI M
HEWITT ASSOCIATES IC INDUSTRIES MICHIGAN STATE UNIVERSITY NORTHW
THE UNIVERSITY OF MINNESOTA WILSON SPORTING GOODS BOSTON UNIVE
GARDNER & PRESTON PANZANI MILLIAT FRERES S.A. BELIN RAYMOND KAISE

A FEW GOOD NAMES THAT

TRONICS CENTER COMMERCIAL UNION INSURANCE GILLETTE CANADA, INC.
WIDE EXPRESS LEVI STRAUSS & COMPANY HBO & CO. A.C. NIELSEN COMPUT
ON HAMILTON OIL CORPORATION DIALOG INFORMATION SERVICES INC. AE
ATION EPRI SOUTHERN COMPANY SERVICES, INC. THE UNIVERSITY OF ELECTR
ECONOMIC SERVICES BERKEY PHOTO HARRIS GRAPHICS ARAMCO SERVICES
RAYCHEM CORPORATION FIRST COMPUTER SERVICES, INC. TECHNOLOGIES, I
MANAGEMENT TEKTRONIX VERSATEC NIELSEN RECHERCHES MARKETING PO
PORATION GREAT WESTERN SAVINGS LOMA LINDA UNIVERSITY SECURITY P
DE CONS TIONS TE TESORO PETROLE SEN RECHER
BURNS C TING SER E CORP. HEV TES IC IN
MAN SE SEIDM PARTON RONICS UNIVE OF MIN
MAINE LS HORLO GARDNE RESTON ZANI M T FRERE
GNIE F CAI ES PET S EDMONT UBLIC SCHOOLS B OF AME
& EL ONIC NTE MMERCIAL N INSURANCE GC T INC. F
COM Y HBC O. IELSEN CO L DATA CORP. N MILLER,
NFC ES AEROPORTS ARIS COMP NEODATA SE
S, I CO E GPA (GR DES POP ES D'ASSURANCE
RA CROCKER K ESID FE HOME LC ANKS INDUSTRIES
A CENTER CE I ON POUR L ELECTR
IES, INC. RHONE- IQUE VOLUN OF AME
ATIQUE VOLUNTARY HOSPITALS OF AMERICA COMPUTING SERVICES FINAN
URITY PACIFIC NATIONAL BANK STANDARD LIFE ASSURANCE THE UNIVERSIT
E CONSTRUCTIONS TELEPHONIQUES TESORO PETROLEUM NIELSEN RECHERC
NTILE BANK BURNS COMPUTING SERVICES HEALTH ONE CORP. PLANNING N
N NATIONAL LIFE RICHMAN GORDMAN SEIDMAN & SEIDMAN CORPORATIO
THE UNIVERSITY OF SOUTHERN MAINE FRALSEN HORLOGERIE ELECTRONICS
GINEERS HAWORTH CORPORATION B. DALTON SPARTON ELECTRONICS NATI

HAVE HELPED US BUILD OURS.

Names of companies who have already tested and proven NOMAD2 superior to any other 4GL/DBMS on the market.

Names that read like the Who's Who of the corporate world. Including leaders in virtually every business around the globe.

Why have they chosen NOMAD2? Confidence.

When making a software acquisition, confidence in the vendor is as important as product quality. And when you're evaluating NOMAD2, here are a few important facts to keep in mind.

- NOMAD2 is a product of the world's largest information services corporation, The Dun & Bradstreet Corporation.
- 80% of NOMAD2 reflects suggestions from our user base.
- There are over 100,000 NOMAD2 users, many of whom belong to local or international users' groups.
- 150 man years have been invested in the ongoing enhancement of NOMAD2.
- 85% of those who try NOMAD2, buy it.

When you study all these facts, one message becomes clear. We are committed to providing the highest level of customer satisfaction and support. To standing behind our products. To meeting every need of our users.

History proves we've done all that for the companies on this list. We'd like to do it for you, too.

NOMAD2, which runs on your mainframe or ours, is another step in the NOMAD evolution that began in 1975. For information, here's another good name to remember. Deborah Cox, D&B Computing Services, 187 Danbury Road, Wilton, CT 06897.
Or call her at
(203) 762-2511.

NOMAD2
The World's Premier 4GL/DBMS

D&B Computing Services
DB a company of The Dun & Bradstreet Corporation

NOMAD2 is a registered trademark of D&B Computing Services, Inc.
NOMAD is a trademark of D&B Computing Services, Inc.

Computer services firms evolving into full-service vendors

By Ninamary Buba Maginnis

Most fast-growing computer service companies are increasingly sharing one attribute — the commitment to provide customers with just about any service they could ever need.

These firms are evolving into full-service vendors whose goal is to provide comprehensive solutions for a single market. The trend is due, in part, to how users are changing their computing requirements.

Customers are moving their applications out of the back office, where mundane, batch-oriented work was performed, into front office — or "mission critical" — applications that perform essential daily business operations, according to Ken Burke, vice-president of research at Alex Brown & Sons, Inc. in Baltimore.

Technology has advanced so rapidly that many MIS managers have curtailed buying sprees and are taking time to assess information systems, Burke says.

Realigning system strategies

The computer industry slowdown can be blamed partly on user companies realigning their system strategy. When these firms begin buying again, they will lean toward companies that can offer a full range of services, many analysts say.

"A full-service vendor is one that can satisfy a broad range of customer information processing needs by providing solutions for customers' problems," Burke says.

"Without a full-service strategy, growth can be limited," adds Cato Carpenter, a financial analyst with Alex Brown. "The strategy is to go after as much of the data processing budget as possible. If you only go for that which software can provide, you're limiting yourself. That's why vendors are targeting large opportunities."

Industry success story

One of the services industry's biggest success stories, Automatic Data Processing, Inc. of Roseland, N.J., experienced enormous growth over the last few years because it consistently expanded its product line to meet customers' increasing needs, according to Automatic Data Processing President William Turner.

"The leading edge in service is far more important than technology — even if the technology is used in the service," Turner says.

"Computer service firms should offer customers all they need — service — as opposed to all that is possible — technology," Turner explains.

Layering services

Turner's company offered payroll services to customers and then layered more services on the initial offering, creating more revenue. The firm added direct deposit, tax filing and administrative personnel tasks.

Five years ago, Automatic Data Processing concentrated on small business and, from an average customer, netted about $3,000 in yearly revenue. Today the firm's average customer provides $30,000 in yearly revenue with some contributing as much as $2 million a year.

Even small companies can leverage their customers by expanding services in their market niche, Carpenter says. Service vendors can also provide hardware by selling vendor equipment via an OEM channel, eliminating the need for customers to buy directly from the computer manufacturer, he notes.

NICKELS AND DIMES

Computer Task Group, Inc. announced that revenue for the third quarter ended Sept. 30 increased 24% to $36.5 million, operating income went up 17% to $2 million and pretax earnings rose 23% to $2.2 million.

Since the company is providing for a higher tax rate than in the previous period, net after-tax income increased 6% to $1.2 million. Because the average number of common shares outstanding for the period was 7,492,000 vs. 6,418,500 (adjusted for splits), earnings per share were 16 cents vs. 17 cents in the third quarter of 1985.

■

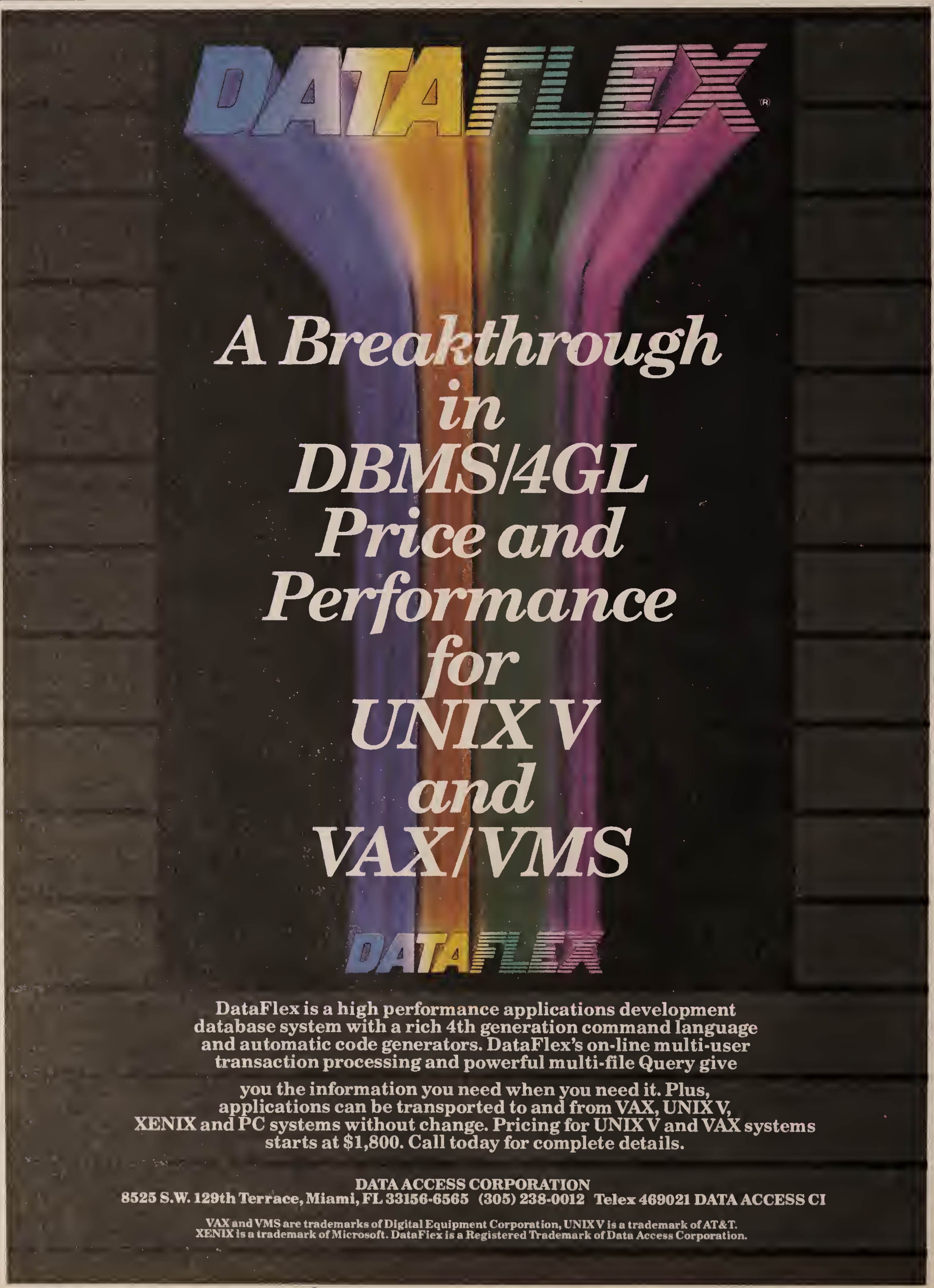
Motorola, Inc. reported revenue for the third quarter of $1.43 billion, up 10% from $1.30 billion in the third quarter last year. Profits were $31 million, or 24 cents per share, compared with a loss of $39 million, or 33 cents per share, last year.

■

Micom Systems, Inc. reported net income of $2.8 million, or 16 cents per share, on revenue of $48.1 million for the second quarter, ended Sept. 30. This compares with net income of $2.7 million, or 15 cents per share, on revenue of $47.1 million in last year's second quarter.

■

Bridge Communications, Inc. announced revenue for the third quarter ended Sept. 27 of $12.2 million, a 51% increase over the $8.1 million reported in the like quarter a year ago. Profits were $1.4 million, or 17 cents per share, compared with $1.4 million, or 16 cents per share, a year ago.



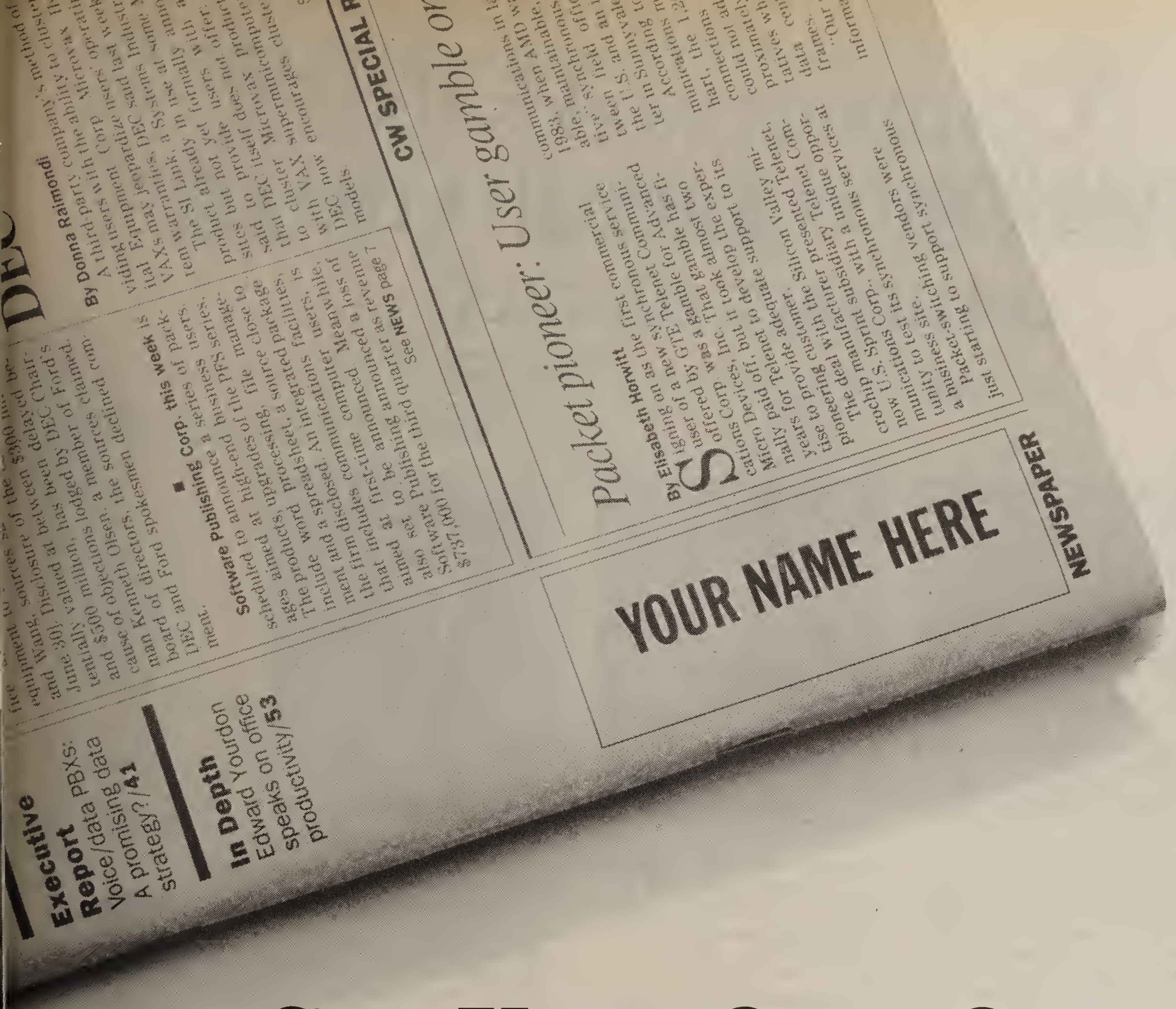
DATAFLEX®
A Breakthrough in DBMS/4GL Price and Performance for UNIX V and VAX/VMS
DATAFLEX

DataFlex is a high performance applications development database system with a rich 4th generation command language and automatic code generators. DataFlex's on-line multi-user transaction processing and powerful multi-file Query give you the information you need when you need it. Plus, applications can be transported to and from VAX, UNIX V, XENIX and PC systems without change. Pricing for UNIX V and VAX systems starts at $1,800. Call today for complete details.

DATA ACCESS CORPORATION
8525 S.W. 129th Terrace, Miami, FL 33156-6565 (305) 238-0012 Telex 469021 DATA ACCESS CI

VAX and VMS are trademarks of Digital Equipment Corporation, UNIX V is a trademark of AT&T. XENIX is a trademark of Microsoft. DataFlex is a Registered Trademark of Data Access Corporation.

See us at Unix Expo Booth No. 169


CW SPECIAL R
Packet pioneer: User gamble on
YOUR NAME HERE
NEWSPAPER
Executive Report
Voice/data PBXs: A promising data strategy?/41
In Depth
Edward Yourdon speaks on office productivity/53

GET YOUR OWN COPY

Why wait? You can have your own copy of *Computerworld* delivered right to your desk every Monday for just 76¢ a week! Plus, we'll give you 12 issues of *Computerworld Focus*. Free.

If you're not the first name on your company's routing slip, chances are you're getting *Computerworld* too late. After all, there's nothing as old as yesterday's news. Let alone last week's.

Computerworld brings you page after page of up-to-the-minute news, hot off the press. Find out about trends and developments in the computer community — the companies and people who shake up the present and shape the future. Discover the latest in new products and new vendor-supplied releases. Read in-depth reports on important stories and analyses of major issues.

What does the next technological breakthrough mean to you? Which new systems and peripherals can you put to work in your company? What are the risks? What are the rewards?

Get all the MIS/DP news you need sent directly to you — while you can still use it. Subscribe to *Computerworld* for the low price of just $38.95 for 51 information-packed issues.

12 Bonus Issues of Computerworld Focus.

Order *Computerworld* now and you'll also receive 12 issues of *Computerworld Focus* — absolutely free. Each issue takes an in-depth look at the hottest topics in the field. Software: Operating Systems, Connectivity, Communications. And more.

Money-Back Guarantee.

If you should decide, for any reason, that *Computerworld* is not for you, tell us. We'll refund your money on all unmailed issues. No questions asked. No strings attached.

Stay on Top.

To stay on top of the latest news and ideas in the computer community, you must stay on top of the routing slip. Get your own copy of *Computerworld* — 51 weeks a year for only $38.95.

Call toll-free **1-800-544-3712** (in Pennsylvania, call collect 215-768-0388) to get your very own copy of *Computerworld* delivered to your desk every week.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

"Computerworld's the Wall Street Journal of the computer market."

Mary Krummenacher
Manager of Marketing
Communications
Polygon, Inc.
St. Louis, MO

Mary Krummenacher, Manager of Marketing Communications for Polygon, Inc., wanted corporate end users to know about their new IBM PC/VAX poly-COM/220 software communications package. She chose Computerworld.

Mary sums up their success: *"In our business, when you advertise technical products like ours, the usual advertising responses are requests for more information. And that's all we usually expect. But not from Computerworld."*

"People are actually ordering our products directly from the ads. And not just a few people — the response has been outstanding."

"It's not surprising, when you think about it. Computerworld is the Journal of the computer market. It's always right on top of what's happening. People have to read it to keep informed. So, to keep our customers and prospects informed about Polygon, we use Computerworld."

Computerworld. We're helping more suppliers reach more buyers, more often, in the computer market. We cover the entire computer world. Every week. We're working for Polygon. We can work for you, too.

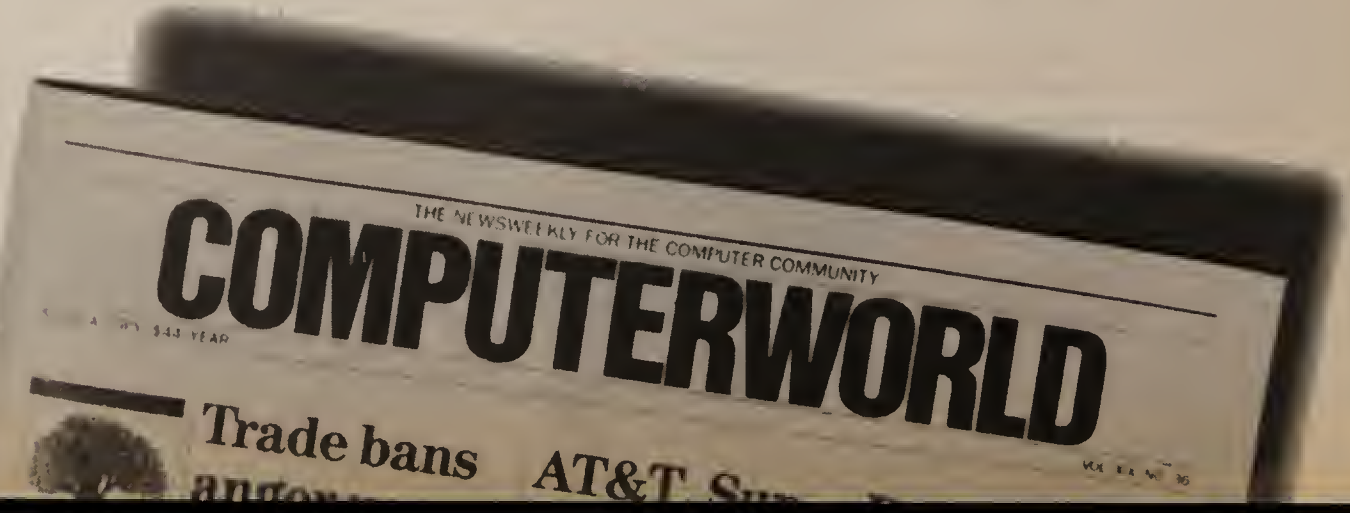
Call your Computerworld representative for all the facts. Or call Ed Marecki, Vice President/Sales, at (617) 879-0700.

Polygon and poly are registered trademarks of Polygon, Inc.

The Wall Street Journal is a 1986 Copyright of Dow Jones & Company.

BOSTON/(617) 879-0700. **NEW YORK**/(201) 967-1350. **CHICAGO**/(312) 827-4433. **ATLANTA**/(404) 394-0758. **DALLAS**/(214) 991-8366. **LOS ANGELES**/(714) 261-1230. **SAN FRANCISCO**/(415) 421-7330.

A PUBLICATION OF CW COMMUNICATIONS



BUY - SELL - SWAP

VAX 11/750 FOR SALE OR LEASE

OCTOBER 13 DELIVERY

VAX 11/750	2mb VMS
H9642-08	EXP CABINET
D211-DP	8 LINE MUX
RUA81-CA	DISK W/CONTROLLER
RA81-AA	456M6 DISK
LA100-BA	CONSOLE

CONTACT BILL MILLER
(313) 254-2850

Vargo

Michael K. Vargo Companies, Inc.
48945 Van Dyke
Utica, MI 48087

Greyhound Capital Corporation
A subsidiary of The Greyhound Corporation

© 1986 Greyhound Capital Corporation

Sales Offices in:
Atlanta, Austin, Boston, Chicago, Dallas, Houston, Los Angeles, Minneapolis, New York, Philadelphia, Phoenix, Pittsburgh, San Francisco.

IBM BUY · SELL · LEASE

36
4300
38
SERIES 1

- Processors
- Peripherals
- Upgrades

DEMPSEY & ASSOCIATES

18377 Beach Blvd Suite 323 • Huntington Beach CA 92648 **(714) 847-8486**

LEAS PAK INTERNATIONAL

BEST PRICE
BEST SERVICE
BEST DELIVERY

WHETHER YOU BUY, SELL, OR LEASE

PRINTERS AND CRT'S

SYSTEM 36 PROCESSORS AND DISK UPGRADES

LARGE INVENTORY

S/34 AND S/38

LEASE FINANCING

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

LEAS PAK INTERNATIONAL™
ONE SOURCE SOLUTION
2120 Forum Parkway, Bedford, TX 76021 Phone 817-267-2841
1-800-LEAS-PAK (In Texas: 1-800-722-7811)

★Buy ★Sell ★Lease ★Rent

IBM. Displaywriters

5525 — OFFICE SYSTEMS
5219 — 5253 — 5258
6670 PRINTERS
SYSTEM/34/36

Up to **50% SAVINGS** on
FACTORY RECONDITIONED

WANG

WPS • OIS • VS Equipment
All equipment is covered by the Wang Service Contract
Authorized Wang
Used Equipment Dealer

CDB FINANCIAL, INC.

3520 DILIDO ROAD
DALLAS, TEXAS 75228
214-324-3491

Member: CDLA-NOMDA

IBM SPECIALISTS

SELL • LEASE • BUY

S/34 S/36 S/38
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

CMA
COMPUTER MARKETING
of America, Inc.

P.O. BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

IBM.
HARDWARE
BUY • SELL • LEASE

SERIES-1
S/34 • S/36 • S/38
S/23 • 4300 • POS

AMCOM
CORPORATION
5200 W 73RD ST
MINNEAPOLIS, MN 55435
612-835-4737 **800-328-7723**

Sale Or Lease

3890-B03

Loaded With Features
Extra Pockets
Less Than 1 Year Old
Monolithic Memory

Need To Buy 3890's

Call Ext. 401
(800) 821-0229
(818) 986-2411
In California

El Camino Resources

FOR SALE

2 Eastman Kodak Oracle Microfilmers 16mm

Accommodates 215-foot rolls of thin based film. Reduces up to 11 by 14" in size.

Call Rick
at IDG
(617) 875-5000
(ext 452)

Comm. Controllers
3705-M83
3704-A2
Sale Or Lease

4381
4341
Sale/Lease

Printers
4245 4248 3203
3800 3262 3287
Immediate Delivery

Controllers
3880 3274
3803 3276
Display Stations
3278 3178
3279 3179

DASD
3380 3375
3370 3350
Immediate Delivery

TAPE DRIVES
3420 3430
3410 3480
Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

Computer Marketing Inc.
PO BOX 0, MARGATE, NJ 08402-0430
609/823-6000
Contact/Bernie Gest
Telex: 5106012293

Established [illegible]

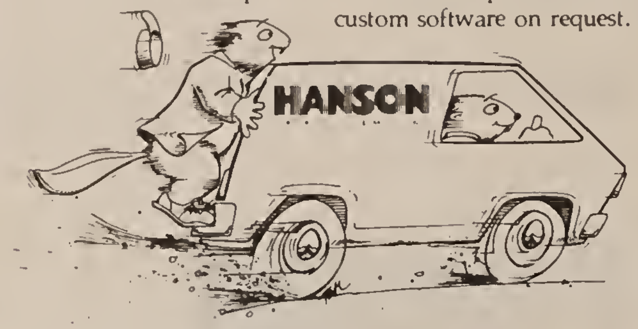
BUY SELL SWAP

Here's Everything You Always Wanted From Data General. But Couldn't Get.

We buy, sell and swap Data General gear of all kinds—processors, peripherals, storage, communications, etc.

But we're also authorized distributors for higher-performance DG-compatible equipment like Spectralogic controllers and C. Itoh and NEC printers, as well as for CDC, Fujitsu, Zetaco, MICOM, FACIT, Data Products and Kennedy.

We've got field service at a fraction of DG's prices. And depot service with immediate replacement of defective parts. As well as custom software on request.



Call or write Hanson Data Systems
60 Brigham St., Marlboro, MA 01752
(617) 481-3901
Outside Mass. (800) 225-9215

HANSON
DATA SYSTEMS INC

Data General's Only Single-Source Second Source.

MICRO VAX II EXTRAVAGANZA FOR SALE

All New in DEC box with warranty-limited quantities available

MICRO VAX II in BA23 with
RD53; RQDX3; TK50; 3MB; two user lic. (no DOC/-media)
$17,500

MICRO VAX II in BA123 with
RD53; RQDX3; TK50; 1MB; DZQ11; two user lic. (no doc/media)
$20,500

MICRO VAX II - Q5 with
H9642; 9MB; RA81-HA; LA100; unlimited license
$57,000

Meadowlark Enterprises
(617) 777-4666
1-800-DEC-DLER (3537)
Telex: 3723046

dda
DIGITAL DEALERS ASSOCIATION

IBM...34, 36, 38, 4300
- BUY
- SELL
- LEASE
(Short or Long Term)

TAPES
DISKS
TERMINALS
PRINTERS

CALL
TOLL FREE
800
258-2233

ICS

IN CALIFORNIA
INTERNATIONAL COMPUTER SALES, INC. • 515 E. 1st St., Suite A • Tustin, CA 92680 (714) 838-3717

BUY DIRECT

*THE COMPUTER MARKET PLACE

SYSTEMS / 34 ● 36 ● 38
BUY, SELL & LEASE COMPLETE IBM SYSTEMS
CPU'S - CRT'S - PRINTERS - UPGRADES
FEATURES & PARTS, ALL MODELS, NEW & USED
Discount Prices ● Express Service ● IBM Maintenance Guaranteed

A TRULY NATIONAL MARKET PLACE...
WHERE ONE TOLL FREE CALL DOES IT ALL!
800-858-1144
*Division of QUALITY ASSOCIATES, INC. • IN CA (714) 630-2965
1140 North Kraemer Blvd. • Suite B • Anaheim, CA 92806

BUY SELL SWAP

AVAILABLE NOW!
5291-1, 5251-11 CRT'S
5251-12 4-8 PORT
5224-2 PRINTERS

DECISION DATA
3751 QTY.
6541 MDL. 2,5,7
6610 ALL MODELS
6665 ALL MODELS
NOW! SALE OR LEASE

CALL PETER BLACK
(313) 254-2850

For Sale or Lease
3830-2 CONTROLLERS
3350 DISK DRIVES
3278-2 DISPLAYS
8K0731 KB
3276-12 CONTROLLERS

WANT TO BUY
IBM 3800-3 LASER PRINTER
Contact Barbara
(313) 254-2850

DEC®-DG SALE/LEASE
VAX-PDP-11
DISK TAPE
TERMINALS

OCTOBER OFF LEASE
DEC 11/785 - XA-AE
DG MV8000-11
VAX 11/780 CA-AP
OCTOBER OFF LEASE
DG MV10000

Call Bill Miller
(313) 254-2850

IBM MASS STORAGE SUB-SYSTEM
IBM 3851
PRICE DROP
Economical use for
- Tape Disk Back-up
- Spare Unit
- Back-up System
- Parts

Call Mike For A Quote
313-254-2850

Vargo
CDLA
dda

48945 Van Dyke, Utica, MI 48087
(313) 254-2850

3704
3705 3725
BUY • SELL • LEASE
Call Toll-Free
800 532-7532
In Minnesota Call 612/829-2800
Centron DPL Company
Member CDLA

BUY SELL SWAP

IBM SYSTEMS,
PERIPHERALS, UPGRADES

SYSTEM 36
SERIES/1
SYSTEM 38
SYSTEM 34
PC, XT, AT
4300/3080
DISPLAYWRITERS
DATAMASTERS S/23

..BUY..SELL..LEASE..

612/894-2200

ALSO: FINANCE & OPERATING LEASES FOR ALL SYSTEMS AND PERIPHERALS.

Valley Computer & Financial, Inc.
12205 Nicollet Ave., Burnsville, MN 55337

SERIES/1

ECONOCOM
USA

IS THE
SOURCE
FOR
SERIES/1
- BUY
- SELL
- LEASE

NEW OR
USED

ECONOCOM-USA, INC.
845 CROSSOVER LANE
P.O. BOX 240297
MEMPHIS, TN 38124
800-238-3098 or
901-767-9130

Rentals Month To Month
Terminal Controller
3174 1L and 1R
Available Now New From IBM
Terminals 3191, 3193
Quantity 3180, 3178
From Lease Base

Call Ext. 401
(800) 821-0229
(818) 986-2411
In California
AEL CDLA
El Camino Resources

BUY SELL SWAP

What

WHAT SHOULD YOU LEASE?
WHAT SHOULD YOU BUY?
WHAT SHOULD YOU SELL?
WHAT SHOULD YOU TRADE?
WHAT SHOULD YOU UPGRADE?

WHEN YOU WANT
ANSWERS,
CALL US

WE BUY • SELL • LEASE
34 • 36 • 38 • SERIES 1 • 4331-4381
ALL PERIPHERAL EQUIPMENT
ALL UPGRADES
SOFTWARE & DATA COMMUNICATIONS CONSULTING

CALL: 800-238-6405
IN TN: 901-372-2622
IN NC: 919-884-0879

CB
COMPUTER BROKERS INC.
2978 SHELBY ST.
MEMPHIS, TN 38134
"SINCE 1974"

ascd

Sale/Lease
Available Now
3081K 48x24
3083BX 24x16
4381P03 f/c 1871

Call Ext. 401
(800) 821-0229
(818) 986-2411
In California
AEL CDLA
El Camino Resources

IF YOU'RE BUYING, WE'RE SELLING.
36
38
4300
IF YOU'RE SELLING, WE'RE BUYING.
IBM SYSTEMS Buy • Sell • Lease PERIPHERALS
(800) 331-8283
TOLL FREE
(213) 306-9343
CALIFORNIA
Ocean Computers, Inc.
8055 W. Manchester Ave., Ste 525
Playa Del Rey, CA 90293

Sell IBM
S/1 **34**
38 UPGRADES
Lowest Prices
36
Call Collect
404-475-7507
DATAMARC
785 Branch Drive
Alpharetta, GA 30201
We Pay Highest Prices For S/34's

MICRO PRODUCTS & SERVICES

- SCREENIO 2.0 -

Realia COBOL screens are a snap with SCREENIO 2.0!

Buy Realia COBOL ($995) and SCREENIO ($400) from us and get $100 off or a free Kedit.

Or, ask us for a FREE demo disk.

NORCOM
Post Office Box 897
Juneau, AK 99802-0897

(907) 780-6464
Telex: 5106014951 NORCOM

Qualified companies can try SCREENIO for free! Call us.

Custom Cables
Send for Catalog
RS232 • Parallel • 422
Coaxial • Dual Wang • 449
Twinaxial • Ethernet
Mod Plug • V.35 • Berg
Ribbon • Din • RCA
Connector Parts
Bulk Cable • Tools
Communication Cable Company
P.O. Box 600, Wayne, PA 19087
215-644-1900

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

MISC.

NEW & USED
RAISED FLOORING
Immediate Delivery
Quality Installation
RAISED COMPUTER FLOORS
One Charles Street
Westwood, NJ 07675
(201) 666-8200
Telex #13-5076

COMPUTER ROOM HVAC

Liebert Model FD-75-A air conditioning/environmental control unit. Six ton capacity. Best offer. Available immediately.

Mary Ann Clynes
Burritt InterFinancial Bancorp.
267 Main Street
New Britain, CT 06010
(203) 225-7601

FOR IMMEDIATE SALE:

ALPHA MICRO/BRITTON LEE
MAM1072 W/STRM TAPE
BL IDM 500/1 500 MB DISK
TAPE DRIVES, SPARES KIT/CRT's

CONTACT: LORRAINE GUIDRY
(214) 931-3200

AIRBORN, INC.

PRIME

LARGE SELECTION OF USED
PRIME COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC.
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON

TSI - the oldest, largest and most experienced supplier of third party peripherals, memories and controllers for Prime users.

BUY ● SELL ● LEASE ● RENT

NATIONAL	800-222-DISK
FLORIDA	800-421-4135

Timesharing Services, Inc., 4080 Woodcock Dr., Jacksonville, FL 32207

WANG

BUY - SELL
MVP/LVP ● OIS ● VS ● PC
SYSTEMS IN INVENTORY
VS-45 ● OIS ● VS-100
GENESIS
EQUIPMENT MARKETING
GEM
(602) 277-8230

LEASE ASSUMPTION

VS85 System $4,463./Month
38 Payments Remaining
Original List $296,730.

Contact Phil Humphries
(703) 437-4200

HOLSON ASSOCIATES, INC.
Authorized
Wang Used Equipment Dealers
Buy and Sell
Guaranteed For Wang Maintenance
2470 Windy Hill Road, Suite 253
Marietta, GA 30067
Call: Richard Holley or Carole Benson
(404) 980-1700

DATA GENERAL

NPA SYSTEMS INC.
for the SALE, LEASE,
PURCHASE & SERVICE OF
DATA GENERAL EQUIPMENT
CALL
(516) 467-2500 (415) 848-9835
(NEW YORK) (CALIFORNIA)
DISASTER PLAN & FACILITY
MANAGEMENT ALSO AVAILABLE

NEW D.G. C.R.T.'s

D214	595.	D411	895.
D215	675.	D461	1125.

Lowest prices on all MV-2000s,
DESKTOPS, MEMORY BOARDS
& MULTIPLEXERS.
ALPHA-KENCO, INC.
1-800-44-KENCO
New York State: 718-633-2800
Formerly Kenco Data Systems

ORDER FORM COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. **Computerworld** comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $160.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Ad size desired: ____________________
Issue Date: ____________________
Section: ____________________
Name: ____________________
Company: ____________________
Address: ____________________
Telephone: ____________________

Send this form to:

COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
617-879-0700 **800-343-6474**

BURROUGHS

BUY SELL LEASE
BURROUGHS
B-20 to B-7900
SPECIAL 207 DISK
(10 Units)
B900 DISK PACK (206 Style)
Subsystem
DEPOT
MAINTENANCE
Computer Provisions
(216) 248-7878

The Bulletin Board

makes selling

your

equipment easy!

MODEMS

PARADYNE
MODEMS
MP-96 (Qty. 124)
Lease only - Any Term
Available 10-1-86
Sutton Equipment Marketing Corp.
(713) 520-9999

HONEYWELL

HONEYWELL SPECIALISTS
LEVEL 6 DPS 6 SERIES 16
The Recognized Leader
In Honeywell Minicomputer
Sales And Support

- Complete Minicomputer Line - New and Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery - Low Prices

** Lease Special - Immed. Delivery **
MSU 9104/9604 256 Mb Disk In Cab
w/Cabling $370.75/Mo
617-393-6839
TWX 710-347-7574
Boudreau Computer Services
Since 1974
100 Bearfoot Rd.
Northboro, Massachusetts 01532

***** FOR SALE *****

Honeywell DPS 6/54 System

2 CDU9639 80 MB Disk Drives
1 MSS9102 67 MB Disk Drive
2 P-300 Printronix Printers
1 MTU9615 75 IPS Tape Drive
14 CRTS (VIP7311 + 7801)

Contact: Jim Harryman
Optimum Software
2241 So. El Marino
Mesa, AZ 85202
(602) 820-4288

PRINTERS

Dataproducts
Factory Remanufactured Printers
Like New
In Appearance & Operation
90 Day Factory Warranty
Call **(818) 888-4291**
and ask for **Varad Raj**

HEWLETT PACKARD

TERMINAL SPECIAL
HP 2392A
& ZENTEC 8392
Quantity Pricing Available

All in stock - immediate delivery
Subject to prior sale
All warranted to qualify
for HP maintenance

BUY * SELL * RENT * LEASE
Processors * Peripherals * Systems
From the HP 3000 Experts!

800/643-4954 213/829-2277
ConAm Corporation
It's Performance That Counts!

HP 3000 ● 1000
9000 *and now* **250**
Buy & Sell Worldwide
ENCORE
(213) 452-9117
Telex 756927

DEC

Merida Trading Group
155 New Boston Street
Woburn, Mass 01801
(617) 933-6790

New RA81AA	$14,250
New RA60AA	$14,000
New RA80AA	$6,200
New DEC Memory 750/780/785	$1,400
New KA780 CPU Set	$12,000
New HSC5XBA	$7,200
New DEQNA	$1,325
Used VAX 11/785	$95,000
Used MS86BA	$6,500
New RM05AA	$3,000
New TU78 Master	$28,000
New DMR11	$1,400
New HSC5XEA	$3,000
New UDA50A	$2,800

(617) 933-6790

DEC
FALL SPECIALS

11/44 CPU Set KD11Z	$3,900
FP86	$19,500
M7475 WCS	$3,700
MF20-M	$4,400
MS630-BA	$1,500
MS630-BB	$2,100
MS750-CA	$1,100
MS11-LD	$275
MSV11-PL	$540
VAX 730 CPU KIT	$4,400
VAX 750 CPU KIT	$8,900
VAX 4MB MS780-JD	$2,900
VAX 4MB MS86-BA	$7,600

QEI, Inc. **(617) 275-6800**
(800)-331-6140 **(504) 641-6140**

For Sale Or Lease
Immediately
DEC 11/70-AC
512 Kb MOS
TWE16-AA Tape
H9602-CC Cabinet
DH11-AE Comm
Call Bill Miller
(313) 254-2850
Vargo Co.
cdla dda

DEC NEW & USED
BUY - SELL - EXCHANGE
Systems ● Processors ● Memory
Options ● Peripherals ● Modules
LAKEWOOD COMPUTER CORP.
436 Link Lane
Ft. Collins, CO 80524
(303) 493-6408

DECMATE II	$1,695.
LQP02	$1,395.

Digital
Computer Resale
(713) 445-0082

DEC

Merida Trading Group
155 New Boston Street
Woburn, Mass 01801
(817) 933-6790
In House Ready To Ship

New VAX 750FA	$35,000
No VMS License	
Quantity 1144DA	$9,500
New	

(617) 933-6790

For Sale
DEC PRO 350s
With TMS Boards
LQP02s
With Sheet Feeders
Call (202) 955-2555

Micro VAX II
DH-630Q5 9Mb H9642
2 ea. RA81-HA w/BC26V-6D Cable
MVMS Unlimited License
TSV05-BA QBUS Mag Tape
Their Price $101,460
Our Price $77,400
Available Immediately
Call Carl 606-269-5324

BUY ● SELL ● TRADE
Planning to buy non-DEC memory?
Check our DEC memory prices first!

BA11-KU
BC26V-50
DD11-DK
DHU11-AP
DZ11-DP
H9642-AP
KDF11-AA
MS11-PB
MS630-CA
MS750-CA
MSV11-JC
TU80-AA

NEW YORK COMPUTER EXCHANGE
(516)752-8666 (800)645-9109

NEW PDP 11/73
At More Than 30% Off List

1 MEG Memory, 71 MEG Drive, Disk Drive, LN03 Laser Printer, (2) VT220, (1) VT100, PLUS Micro/RSX FMS-11, COBOL-81, A to Z, List Price New-$34,090. Will Sell-$19,950 or best offer.

Contact Bob Stiles (603) 886-4937

IBM

4341-P2
4341-N2
Available Now
Sale Or Lease
Call Pete
(313) 254-2850
Vargo Co.
cdla dda

4361, 4381
All Models Available
Call Russ Schneider
800/426-4341
In CA 408/241-3677
Marketex Computer Corp.

34-36-38
Systems,
Peripherals & Upgrades
Guaranteed Quality Service
Special Reduced Prices
New and Used Equipment
Carlyn Computer Systems, Inc.
800-828-4227
In VA (703) 642-1950

3180
3178, 3179,
3278, 3274
All Other IBM Units Available
Call Penny 800/426-4341
In CA 408/241-3677
Marketex Computer Corp.

S/38 S/36 S/34
SERIES 1
BUY - SELL - LEASE
Systems, Peripherals & Upgrades
Source Data Products
800/328-2669 415/326-7333

IBM

S/38
Mod 5, Mod 8, Mod 18
Immediate Availability
Must Sell Or Lease
Source Data Products
800/328-2669 415/326-7333
Call Bob Losey

SYSTEM 38
Sale Or Lease
Immediately Available
Model 40 Or Model 700
With Or Without Peripherals
Save Up To $70,000
Call Al (714) 770-2122

BUY ● SELL ● SAVE $
IBM DISPLAYWRITERS
34'S, 36'S, 38'S
PERIPHERALS
LRK RESOURCES UNLTD INC.
CALL LAURIE OR RICK
713-437-7379

IBM Series - 1

2 - 4955/F	512k Processors
2 - 4959	Expansion Units
2 - 4969	Tape Drives
2 - 4964	Diskette Drives
2 - 80270	CDC Disk Drives
2 - 4978	Terminals
3 - 3101	Terminals
2 - MMT/2	IDS Channel Switches

BA Futures, Inc. 312/876-2357

IBM System 38
Model 400
6 Meg Memory Plus Features
Available Approximately 8 Weeks
Call Bud (209) 445-2600

DISKCO MARKETING CORP.
BUY & SELL
Displaywriters
34's, 36's, 38's, 4300's
Call **1-800-325-4443**
in Texas **806-797-1823**
4910 Frankfort Ave.
Lubbock, TX 79424

SYSTEM 38
Model 600
Available Now
Save $60,000 (30%)
Ocean Computers, Inc.
(800) 331-8283 (213) 306-9343
Call Tom or Chuck

SALE/LEASE
S/36
Model B Or C
With Or Without Peripherals
Call Louis Felder (914) 238-9631
Computer Merchants Inc.

FOR SALE/LEASE
3880-003's
3380-AA4's
& B04's
Bluebonnet Computer Co.
(512) 926-3900

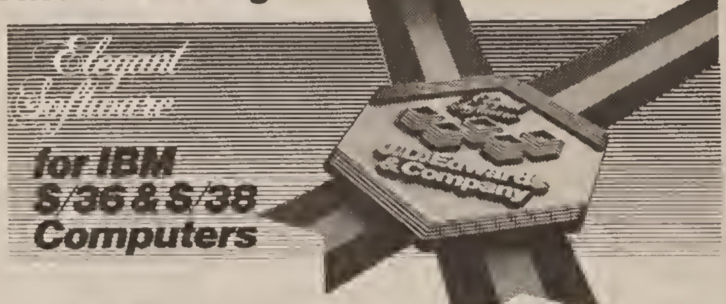
SALE/LEASE
S/38
5382-FQ1 Processor
5382-9YA Processor
3370-A12 Disk
3430-A1 Tape & Ctl.
3430-B1 Tape
Call Ron Gibb (914) 238-9631

IBM BO1's
Available in NJ, VA & UT
IBM maint. $5,000 ea.
Call Quinn Data Products
at 302 429-7450

Sale or Lease
3430 - AO1
3274 - D1
5291 - 1's
Call Tom Volpenhein
513-721-3399

SOFTWARE FOR SALE

Award-Winning



Featuring:

- *Built-in Flexibility*
- *Broad In Business Scope*
- *Completely Integrated*
- *Simplified Operation at Reduced Cost*

General Accounting
Accounts Payable
Accounts Receivable
Equipment & Fixed Assets
Financial Reporting
Planning & Budgeting
Job Cost Accounting
Payroll/Personnel
Inventory Management
Order Processing
Sales Analysis
Oil & Gas Accounting

J.D. Edwards & Company

4949 S. Syracuse / Suite 5500
Denver, CO 80237
303/ 773 3732

New York — 201/ 729 8884
Dallas — 214/ 458 0636
Houston — 713/ 880 8278
San Francisco — 415/ 571 5755
Newport Beach — 714/ 955 0118
Chicago — 312/ 571 6687

IBM Value Added Remarketer

CONVERTING S34 or S36

Our RPG II to COBOL translator package .was specifically designed to help you convert from your IBM S34 or IBM S36 to an IBM mainframe environment quickly and cost effectively. Online programs are converted to CICS Command Level COBOL and Basic Mapping Support Source. Flexible licensing plans are available.

BAKKEN and ASSOCIATES
2666 Cedar Creek Road
Jackson, WI 53037
(414) 289-7289

SHIP A DISK

Are you selling a software package? For the best results, advertise it in the **Software for Sale** section of Computerworld's classified pages. More than 600,000 computer-involved professionals receive Computerworld each week.

Place your ads today. Simply call toll-free at (800) 343-6474. In Massachusetts call at (617) 879-0700. Call now.

And don't forget to ask for your copy of our "1985 Quick Reference Rate Card" so you can find out how to earn linage discounts.

TIME & SERVICES

We challenge you to find a timesharing price we can't undersell.

Financial Technologies

14300 Sallyfield Circle
Chantilly, Virginia 22021
(703) 631-4300

COMPUTING SERVICES

CPU 1	CPU 2
MVS/XA	VM/370
CICS	DOS/VSE
IMS	CICS
TSO	CMS

- ** IBM HARDWARE
- ** FULL TECHNICAL SUPPORT
- ** FOURTH GENERATION LANGUAGES
- ** NATIONWIDE ACCESS
- ** GUARANTEED RESPONSE AND AVAILABILITY
- ** FULL DISASTER RECOVERY BACKUP
- ** ON-SITE CUSTOMER AREA
- ** FULL SECURITY
- ** VOLUME AND TERM DISCOUNTS

For more information please contact.

BURNS COMPUTING SERVICES, INC.

10 Gould Center
Rolling Meadows, IL 60008
Midwestern Sales (312) 981-5260
Eastern Sales (212) 432-1151 • (215) 398-3600

MVS - VM - DOS

ROSCOE IMS

computer time

201-930-0051
212-921-8855

tbi

TIME BROKERS, INC.

WYLBUR IDMS

CICS - TSO - CMS

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCF
All Shifts Available
3370 Disk, 3420 Tape
800/1600 Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palmo
Restamatic Data Services
(212) 997-1439

ICOTECH

Innovative Computer Techniques
DATA PROCESSING SERVICES
IBM 3081 DEC-10 VAX 8600

- Batch Processing
- Timesharing
- Microfiche
- Public Network Access
- Laser Printing
- Optical Mark Reading

Introducing . . .
the ICOTECH
Health & Safety Information System
Route 202 • Raritan, N.J. 08869
201-685-3400 • Contact: Joyce Bogeenko

BIDS & PROPOSALS

REQUEST FOR PROPOSAL

West Virginia Network for Educational Telecomputing is soliciting proposals to upgrade an IBM 3081 GX Computer Processor to an IBM 3081 KX and provide associated direct access storage devices. Proposals will be received until Wednesday, November 12, 1986, at 3:00 p.m. The detailed proposals can be obtained at or by writing to WVNET Business Office, 1189 Pineview Drive, Morgantown, West Virginia 26505 or by calling Mr. John Hays at 304-293-5192. Refer to RFP number 12354 when requesting information.

Computerworld CLASSIFIEDS

Our business
is to help you
improve yours--

via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities, AND...

exposure to an audience of over half a million readers NATIONWIDE... ...EVERY WEEK.

POSITION ANNOUNCEMENTS

SYSTEMS PROGRAMMERS

The Tennessee Valley Authority is an independent corporate agency of the Federal Government which provides safe, reliable power for nearly all of Tennessee and adjacent portions of six states. Supporting our vast operations is a large data processing center with multiple IBM and Control Data computers.

Systems Programmers are needed in Chattanooga, Tennessee, to install and maintain the CDC and IBM operating systems including MVS/XA, JES3, VTAM, and NOS, to support a large DASD facility, and to provide support for major software packages such as CADAM, CICS, DB2 and Model 204. A BS Degree in Computer Science or a related field, 5 plus years of experience, and good oral and written skills are required.

TVA provides an attractive salary and excellent benefits. For consideration please forward resume including salary requirements, citizenship and social security number to:

TVA

TENNESSEE VALLEY AUTHORITY
Employment Branch CW0050
Room 240 MIB
Knoxville, TN 37902

EQUAL OPPORTUNITY EMPLOYER TVA may consider for appointment only U.S. citizens and others eligible for payment under applicable statutes

DIRECTOR OF COMPUTING SERVICES

Four functional areas comprise computing services: Computer Operations, Data Control, Communications, and Technical Support.

Position of Director requires Bachelor's degree plus 5 to 10 years data processing experience. Management experience in large IBM mainframe environment required. Certificate in data processing, academic or medical data processing background desirable.

TECHNICAL SUPPORT MANAGER

Responsibilities include supervision of technical support staff.

Position requires Bachelor's degree plus 5 years data processing experience, 2 of which must have been in large IBM mainframe technical support group, utilizing VM, MVS, DOS and related software. An equivalence in education and work experience may be considered.

Applicants for above positions must demonstrate good management, organization and communication skills.

Apply to:

Jean W. Strickland, Employment Manager
Medical University of South Carolina
Dept. of Human Resources Management
171 Ashley Avenue
Charleston, SC 29425
An Equal Opportunity M/F
Affirmative Action Employer

Systems Analyst - Bachelor's Computer Science and 9 months experience to consult with clients, modify systems or create new systems. Supervise programmers and others. Use IBM and compatible systems using variety of computer languages. $30,000 per year, 40 hour week. File 4326. Send resumes to NYS Job Service #NY8029593, 97-45 Queens Blvd., Rego Park, NY 11374.

SERIES 1/TELECOMM. CONSULTANTS

Rapidly expanding consulting firm has many new contracts in the Midwest for professionals with experience in any of the following Series 1 EDX/EDL, SNA/SDLC, Ethernet, Fiber-Optic technology. This organization offers an aggressive future for your career and gives you the variety that only consulting can give you. Salary open, depending upon experience

ROBERT HALF
DATA PROCESSING
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

SR. SYSTEMS ANALYST

Lead and direct research and develop projects in the development of communications systems on IBM Series/1 CM. Minimum experience: 5 years as Project Manager in Series/1 and communication protocols development. Must have knowledge of, and experience with, LANS, Series 1 Internals, SNA protocols, and IBM office system. Bachelor's degree with at least minor in computer science. Annual salary: $56,000, 35 hours/week. Send resumes to: Manager, Human Resource Services, IMNET, 2 Broadway, 20th Floor, Suite 2, New York, NY 10004. An equal opportunity employer.

Dynamic, established software company, eager for growth, needs entrepreneurs to work on commission plus expenses basis at state/-regional/country level selling the best all-around text retrieval software for WANG VS in the industry. Familiarity WANG computers desirable.

Please reply to:

Kwic Software, Inc.
6 Landmark Square
Stamford, CT 06901-2792

Find an exciting new computer position in our free Digest!

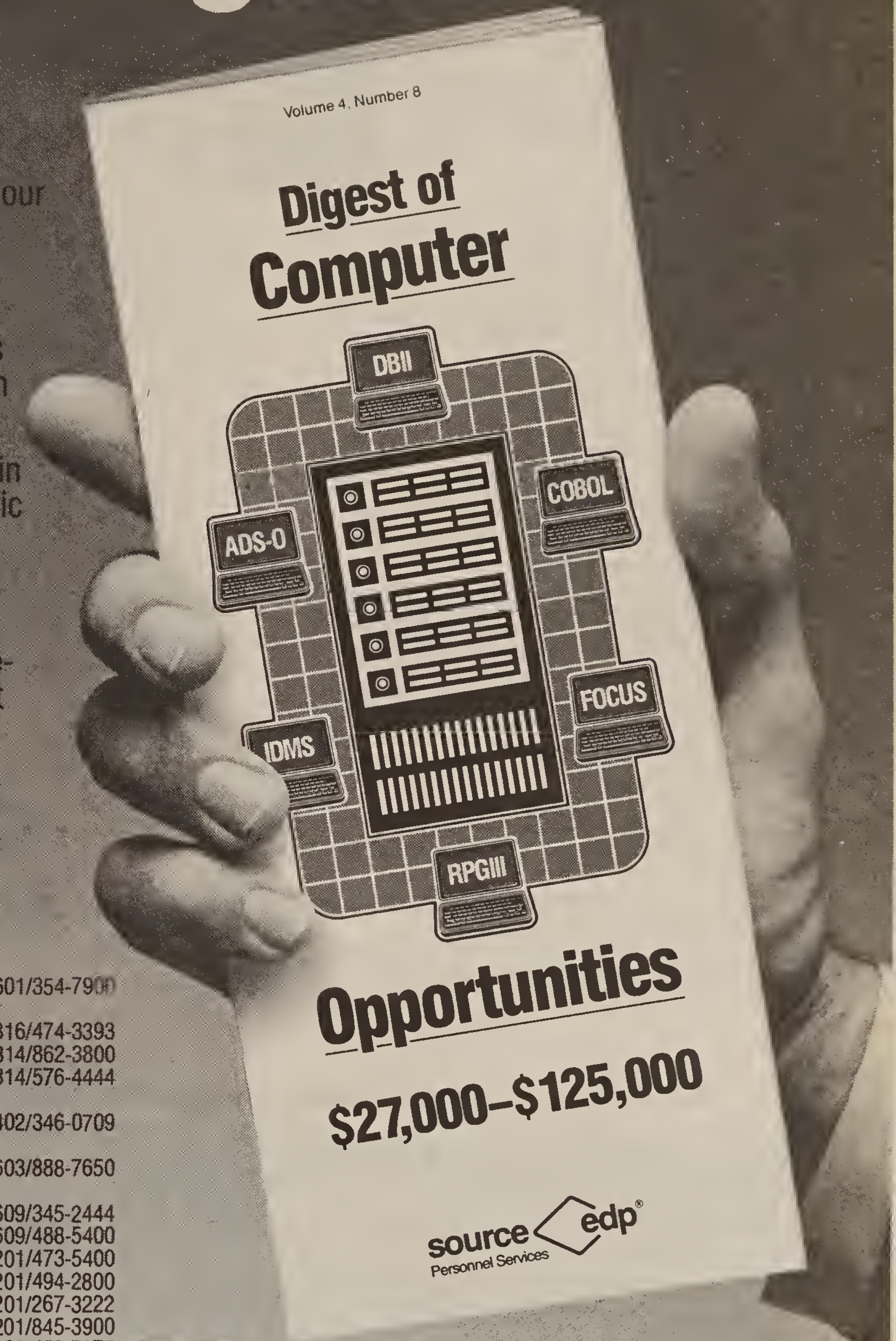
- 663 new position openings described
- 34 major geographic areas covered
- Salaries included with every description

Hundreds of career opportunities in leading-edge firms are presented in our new 48-page *Digest of Computer Opportunities.*

Included are position openings in programming, systems analysis, software development and support, management consulting, sales and marketing support and all levels of computer and information systems management. You'll see how you can gain state-of-the-art exposure in just about any discipline you'd like to explore.

The ***Digest*** is organized geographically so you can evaluate openings in your home town or city. Or anywhere else across North America. Specific responsibilities, experience needed and more are covered for every opening. Best of all, starting salaries, bonuses or equity opportunities are specifically cited with every description.

Call Source Edp for your free copy. As the leading recruiting firm that specializes exclusively in the computer profession, we can provide expert assistance whenever you feel you would like to evaluate your career. Our professional staff is comprised entirely of people having extensive computer backgrounds. So you will always get sound advice in selecting the best career path alternatives. And, of course, there is never any obligation or expense to you since our client companies assume our charges.



Call the office nearest you

To receive your free copy call the Source Edp office nearest you listed below.

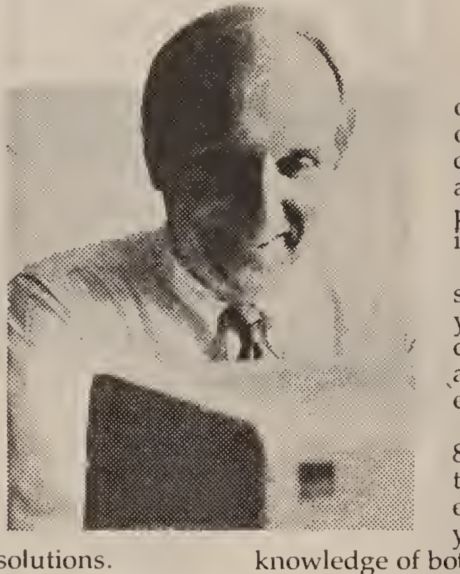
United States:	
Alabama	
Birmingham	205/322-8745
Arizona	
Phoenix	602/279-1010
Tucson	602/792-0375
California	
Northern	
Mountain View	415/969-4910
Sacramento	916/446-3470
San Francisco	415/434-2410
Walnut Creek	415/945-1910
Southern	
Fullerton	714/738-1313
Irvine	714/833-1730
Los Angeles	
Downtown	213/688-0041
South Bay	213/540-7500
West	213/203-8111
San Diego	619/573-0100
San Fernando Valley	818/905-1500
Colorado	
Colorado Springs	303/632-1717
Denver	303/298-8268
Englewood	303/773-3700
Connecticut	
Danbury	203/797-0590
Hartford	203/522-6590
New Haven	203/787-4595
Stamford	203/967-4888
Stratford	203/375-7240
Waterbury	203/574-5633
Delaware	
Wilmington	302/652-0933
District of Columbia	
Washington D.C.	202/293-9255
Florida	
Fort Lauderdale	305/491-0145
Jacksonville	904/356-1820
Melbourne	305/725-3095
N. Miami Beach	305/940-1014
Orlando	305/282-9455
Tampa	813/222-0007
Georgia	
Atlanta/Downtown	404/588-9350
Atlanta/North	404/953-0200
Atlanta/Perimtr.-400	404/255-2045
Illinois	
Chicago/Loop	312/372-1900
Oak Brook	312/986-0422
Peoria	309/673-0274
Rolling Meadows	312/392-0244
Indiana	
Fort Wayne	219/432-7333
Indianapolis	317/631-2900
Iowa	
Des Moines	515/243-0191
Kansas	
Overland Park	913/888-8885
Topeka	913/232-6722
Wichita	316/688-1621
Kentucky	
Louisville	502/581-9900
Louisiana	
Baton Rouge	504/924-7183
New Orleans	504/561-6000
Shreveport	318/222-6188
Maryland	
Baltimore	301/727-4050
Beltsville	301/595-4884
Columbia	301/730-6833
Rockville	301/258-8800
Towson	301/321-7044
Massachusetts	
Boston	617/482-7613
Burlington	617/273-5160
Springfield	413/739-4083
Wellesley	617/237-3120
Michigan	
Detroit	313/259-7607
Grand Rapids	616/459-6539
Lansing	517/484-4561
Southfield	313/352-6520
Troy	313/362-0070
Minnesota	
Bloomington	612/835-5100
Minneapolis	612/332-6460
St. Paul	612/227-6100
Mississippi	
Jackson	601/354-7900
Missouri	
Kansas City	816/474-3393
Clayton	314/862-3800
St. Louis	314/576-4444
Nebraska	
Omaha	402/346-0709
New Hampshire	
Nashua	603/888-7650
New Jersey	
Atlantic City	609/345-2444
Cherry Hill	609/488-5400
Clifton	201/473-5400
Edison	201/494-2800
Morristown	201/267-3222
Paramus	201/845-3900
Princeton	609/452-7277
Somerset	201/469-9444
New Mexico	
Albuquerque	505/247-4270
New York	
Albany	518/482-2035
Buffalo	716/855-0400
New York City	
Grand Central	212/557-8611
Penn Station	212/736-7445
Wall Street	212/962-8000
Rochester	716/263-2670
Syosset, L.I.	516/364-0900
Syracuse	315/422-2411
White Plains	914/694-4400
North Carolina	
Charlotte	704/552-6577
Greensboro	919/379-1155
Raleigh	919/847-7605
Winston-Salem	919/724-0630
Ohio	
Akron	216/535-1150
Cincinnati	513/769-5080
Cleveland	216/771-2070
Columbus	614/224-0660
Dayton	513/461-4660
Toledo	419/242-2601
Oklahoma	
Oklahoma City	405/722-7410
Tulsa	918/599-7700
Oregon	
Portland	503/223-6160
Pennsylvania	
Allentown	215/776-0524
Harrisburg	717/761-8790
King of Prussia	215/265-7250
Philadelphia	215/665-1717
Pittsburgh	412/261-6540
Reading	215/374-4230
Scranton/Wilkes-Barre	717/655-6464
Rhode Island	
Providence	401/751-0065
South Carolina	
Columbia	803/256-7446
Greenville	803/271-7044
Tennessee	
Chattanooga	615/265-8890
Memphis	901/525-0743
Nashville	615/256-0625
Texas	
Austin	512/479-0720
Dallas	
Central	214/954-1100
North	214/387-1600
Northwest	214/869-1100
El Paso	915/532-6316
Fort Worth	817/338-9300
Houston	
Downtown	713/751-0100
San Antonio	512/342-9898
Utah	
Salt Lake City	801/966-3900
Virginia	
McLean	703/790-5610
Washington	
Seattle	206/454-6400
Spokane	509/838-7877
Wisconsin	
Green Bay	414/432-1184
Madison	608/251-0104
Milwaukee	414/277-0345
Canada:	
Alberta	
Calgary	403/279-1940
Edmonton	403/459-1153
British Columbia	
Vancouver	604/222-1155
Manitoba	
Winnipeg	204/942-1151
Ontario	
Mississauga	416/848-3344
Toronto	416/591-1110
Willowdale	416/495-1551

source edp®
Personnel Services

The world's largest recruiting firm devoted exclusively to the computer profession.
Client companies assume our charges.
Source Edp, Department 7022, P.O. Box 7100,
Mountain View, CA 94039.
(When writing, please include your title.)

Telecommunications — Account and Marketing Managers

SEE IT THROUGH.



The big picture. That's what you're a part of when you join The Travelers.

Our telecommunications professionals don't work on just a piece of the action, they see entire projects through from start to finish. And, they see the results of their efforts on the people and productivity of a $43 billion financial services leader.

What's more, our people do more than shape solutions. They help shape our future by determining the direction of telecommunications today and tomorrow.

If you're ready to make a key contribution, consider joining us in our Hartford, CT home office.

ACCOUNT MANAGERS

You'll act as the key liaison between our systems professionals and various client departments company-wide. Using your technical talent and business savvy, you'll consult with clients, evaluate goals, and determine the resources necessary to meet the particular business requirements with telecommunications solutions.

To qualify, 2-3 years telecommunications experience in either a corporate or vendor setting is necessary. A college degree with relevant major or the equivalent is required. A voice and/or data background is also required. Familiarity with packet switching networks and telecommunications hardware and software including VTAM, NCCF, SNA, SDLC and NCP is a must.

But technical know-how isn't enough. We're looking for a strong communicator, an able advisor. Someone with a flair for marketing and a sense for financial decision-making.

MARKETING MANAGER

This key position offers big responsibility and high visibility. Managing a staff of 12-15 professionals, you'll ensure overall client satisfaction; oversee, coach and develop the account management team; and perform a critical marketing function.

When you're not supervising your staff, you'll service important clients. Managing projects and interacting with engineering to get results.

To qualify, you need 8-10 years experience in a telecommunications environment. Ideally, your background includes knowledge of both voice and data communications as well as software and networking concepts. An advanced degree is preferred.

Most important are strong "people" skills and a proven management record. We're looking for a good communicator, a strong motivator, a tough negotiator.

Both positions offer ongoing challenge and broad exposure. Plus a competitive salary, complete benefits and career growth potential. What's more, you'll have the chance to make an impact on the future of telecommunications in one of the most advanced environments in the industry.

So, if you think you're one of the people we're looking for, see it through. Today. Send your resume to: Dorothy Smith, The Travelers Companies, 30-CR, CW1020, One Tower Square, Hartford, CT 06183-7060.

Data Processing
For Dedicated People.

TheTravelers

The Travelers Companies, Hartford, Connecticut 06183.

An Equal Opportunity Employer.

NEW ENGLAND

BOSTON
PROJECT LEADER - HP3000
Successful hi-tech firm seeks strong indiv. for proj. ldr. role. Environ. is HP3000 COBOL FORTRAN IMAGE COGNOS ASK. Oppty. to play key role in small dept. as it implements new apps. Salary to $36,000.

BOSTON
VAX INFO. ANALYST
Progressive conglomerate seeks seasoned tech. specialist for finance div. liaison role. Previous VAX/VMS, BASIC & DATATRIEVE req., PC LOTUS 1-2-3 a plus. Excellent combo. of acctg./fin. & computer devel. activities. Salary to $34,000.

BOSTON
SYSTEM-38 SPECIALIST
Nat'ly. recognized mfr. seeks lead P/A for new devel. & major enhance projs. Extensive RPG-III, CL, SDA & other utilities knowl. desired. Rapid tech. & positional adv. pot.! N.E. candidate pref. Salary to $33,000.

HARTFORD
IDMS DBA
Hartford area suburban client seeks IDMS exp'd., tech. oriented indiv. to join growing data base area. Lead the design of IDMS/ADSO based systems for this Fortune 100 co. 2+ yrs. of IDMS exp. + desire for tech. career req. Salary $30-$42,000.

HARTFORD
PROG./ANALYST
SYS./ANALYST
Hartford area oppty's. for P/A's & S/A's w/CICS & IMS or IDMS exp. 2+ yrs. exp. req. for oppty. to work in state-of-the-art IBM environ. & implement data base sys. Our client will provide data base training for qualified candidates w/2 yrs. COBOL. Excellent oppty. for indiv's. seeking growth & advancement. Paid reloc. Salary to $37,000+.

PROVIDENCE
RETAIL PROJECT LEADER
If you have 5+ yrs. CICS support exp. & seek the step up to mgmt., consider this oppty. Environ. is 43XX, OS/MVS, CICS. Previous devel. in warehouse distribution/inventory sys. a +. Co. prefers N.E. candidate. Salary $50,000.

ROBERT HALF

EDP PERSONNEL SPECIALISTS

Contact the Manager of any office listed below.

100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
900 Turks Head Bldg., Providence, RI 02903
(401) 274-8700

R-H ®

Client Companies Assume All Fees.

Director of Information Services

MIT seeks a Director of Information Services to direct and manage the Information Services Division of the Information Systems Department. Information Services is responsible for providing end-user computing support services to MIT's academic, administrative, and research communities. The Director will be responsible for the design, development, implementation and marketing of new services to support the changing needs of the Institute's diverse end-user community in a rapidly changing technological environment; for developing close relationships with the principal end-users; for establishing performance measurement systems to monitor and improve the effectiveness of services offered; for preparing short and long range goals for Information Services; for preparing and administering budgets; and for hiring, evaluating, and developing professional staff.

The successful candidate should have a bachelor's degree or equivalent combination of education and experience, a minimum of five years of experience in the management of computing activities, and be able to work at both strategic and operational levels. He or she will be a polished professional who has excellent people and communication skills, a service orientation, demonstrated ability to build effective teams, and is a doer with consistent results.

Send two copies of resume, attention Job #A86-835, to Sally H. Hansen, MIT Personnel Office, 77 Massachusetts Avenue, Cambridge, MA 02139.

MIT is an equal opportunity/ affirmative action employer.

MIT

"We have it in our power to begin the world over again"

Thomas Paine
American Political Philosopher and Author

You have it in your power to change your world and your career by contacting TRW's Operations and Support Group. Our Financial and Data Services Division is a multi-faceted data processing organization. We provide a broad range of services from applications development to user tech support. Our facilities, hardware and software are state-of-the-art, creating an environment conducive to top quality, imaginative work. The following is a listing of the kinds of opportunities available in our environment:

- **Mainframe—Focus Specialist**
- **IDMS Systems Programmer, Senior**
- **Test and Integration Project Leader—IDMS**
- **MVS, ACF2 Software Security Specialist**
- **MVS, VM DASD Software Specialist**
- **Programmer Analyst, Senior-IDMS/ADS-O**

TRW offers excellent salaries and benefits including medical, dental and vision care coverage, liberal stock savings program, and flexible hours. Please forward your resume to: **TRW O&SG, R. Chambers, E1/4029, Dept. CW, One Space Park, Redondo Beach, CA 90278.**

Equal Opportunity Employer
U.S. Citizenship Required

TRW

Atlanta

"Heart of the Southeast"

Explore the exciting career opportunities in the growth center of the Southeast. The professional challenges and quality of lifestyle cannot be surpassed.

IMS DB/DC	C/UNIX
TANDEM	IDMS
ADABAS	LIFE/70
MVS-XA	4th GENERATION
HONEYWELL	UNIVAC

FOCUS
EDP Recruiters
3 Corporate Square, Suite 340
Atlanta, Ga 30329 (404)321-5400
out-of-state call
1-800-423-1989-2236

GREATER BOSTON

Boston's thriving economy provides excellent career opportunities for experienced MIS professionals, and Eastern Massachusetts has always offered an outstanding year-round quality of life.

For 20 years ROMAC has been a leader in the placement of MIS professionals.

Contact us today - career opportunities in the $25-60,000 range.

ROMAC®
20 Walnut Street, Dept. C
Wellesley Hills, MA 02181
617-239-0900

SR. SYSTEMS ANALYST-Resp. for design & programming of a Network Advertising System for major Nat'l Broadcasting Network. The system replaces an older system running on UNIVAC 1100 computers & will allow the network to migrate its software environment to IBM products. Incl. logical data base design- ADS/O dialog prototyping, development to algorithms to define demographics of advertising population, IDMS/CICS coding & post implementation maintenance. 2 yrs exp or 2 yrs rel exp - duties as a Systems Analyst. Master's degree Com Sci or an Engin field. Must know COBOL, CICS, IDMS, ADS/O VSAM, CULPRIT, OS/JCL & database admin. Use large IBM mainframe hardware. $45,000/yr, 40 hrs/wk. Datronics, Inc. 675 Third Avenue, New York, NY 10017. Send resume.

Position: Total Hours Per Week: 40. **Work Schedule**: 8:00 a.m. to 5:00 p.m., Monday - Friday. **Salary**: $25,200 per year. **Duties of Job**: Primarily maintain and redesign existing computer programs for changing business applications. Also, design and implement new computer programs for specific business applications, such as inventory control, cost analysis, user interface, and systems security. Identify and analyze business applications. **Education and Experience Requirements**: M.S. in Computer Science; must have taken the following university or college courses: (1) PASCAL or BASIC computer languages; (2) computer software development; (3) data structures; and (4) data base management; no experience or training required. **Applicants must send resumes** to: 7310 Woodward Avenue - Room 415, Detroit, Michigan 48202. Reference Number: 61586.

All Hospitals
Are Not Created Equal

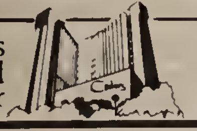
Senior Systems Programmer

Cedars Medical Center, one of Miami's finest acute care facilities, has an immediate need for a Senior Systems Programmer.

The individual we seek will need 1-3 years experience in installation and maintenance of VM, DOS/VSE and CICS systems. Knowledge of ALC programming language preferred, as well as familiarity with IBM 4331 and 4341 equipment.

Cedars offers excellent salaries and comprehensive benefits. Please call Eleanor collect at **(305) 325-5687** or send resume to: **E. Klein, Personnel Services, Cedars Medical Center, 1400 NW 12th Ave., Miami, FL 33136.** An equal opportunity employer.

Cedars
Medical
Center



FLORIDA

P/A-SYS 38-RPG III	TO 30K
P/A-SYS 34-MAPICS	TO 25K
SYS PROG-MVS-CICS	TO 38K
SR P/A-MVS-MFG-COBOL	TO 30K
P/A-McCORMICK & DODGE	TO 32K
P/A-SYS 36-2 Yrs Exp	TO 30K
P/A-MSA PACKAGES	TO 32K
P/A-MVS-IDMS-ADSO	TO 32K
P/A-IMS DB/DC-MVS	TO 29K
DBA-DB2	TO 40K
P/A-DB2/SQL	TO 35K
SYS PROG-VAX-VMS	TO 30K
P/A-SYS 38-MAPICS	TO 33K
SYS PROG-Strong VM BKGD	TO 35K
DBA-IMS DB/DC	TO 39K
SYS PROG-CICS	TO 32K
P/A-ADABAS/NATURAL	TO 32K
P/A-IDEAL-ADR	TO 28K
P/A-TANDEM/PATHWAY	TO 30K

STAN ALLEN

ROBERT HALF
OF TAMPA, INC.
1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

HELP WANTED: Manager of International Manufacturing

PLEASE SEND RESUME TO:

EMPLOYMENT SECURITY DEPARTMENT
ES DIVISION, ATTN: AEC # 45811
OLYMPIA, WA 98504

JOB DESCRIPTION: Directs and coordinates activities of international manufacturing division of computer software manufacturing organization. Plans, develops, and implements organizational policy and goals. Coordinates specific functions of division such as engineering, manufacturing, and research and development. Analyzes division's budget requests; determines operating budget. Represents organization in industrial manufacturing associations worldwide. Travels abroad as necessary.

REQUIREMENTS: MASTER'S DEGREE IN BUSINESS ADMINISTRATION, WITH MAJOR IN MANAGEMENT. FOUR YEARS EXPERIENCE MANAGING THE MANUFACTURING DIVISION OF A COMPUTER PRODUCTS COMPANY.

SALARY: $44,000 per annum.

JOB LOCATION: 70% IN U.S. (PRIMARILY REDMOND, WASHINGTON);

EOE.

COBOL Programmer

Established software manufacturer seeks good COBOL Programmer with 3+ years experience preferably with VAX/VMS or Wang VS. MCBA s/w experience preferred. Have openings in R & D as well as product support. Competitive salaries. Good location. Challenging and friendly environment. Send resume and salary history to

MCBA
425 W. Broadway
Glendale, CA 91204

AMONG THE 100 BEST PLACES TO WORK IN AMERICA.

All across the nation — in newspapers, books and magazines — people have been saying superlative things about Northrop. Levering, Moskowitz and Katz wrote about Northrop in their book *The 100 Best Companies To Work For In America.* Fortune magazine said we were "first for innovativeness." And Dun's Business Month called us a "self-sufficient, technological powerhouse, which pours huge amounts of its own money into research and development."

Set the standards in aerospace technology with the company that sets itself above the rest.

IMS DB/DC DATABASE SPECIALIST

Data modeling analysis, logical and physical database design, database maintenance activities including backup, recovery and reorganization involving a working knowledge of IMS utilities. Requires experience in database performance monitoring and tuning, Fourth Generation languages, IDMS applications and 5 years experience as an IMS DBA.

PROGRAMMERS/ANALYSTS

Analyze and develop systems design solutions to Manufacturing and Engineering business application problems. Interact with users, implement systems with an integrated database architecture. IMS DB/DC, COBOL and related software experience required. Also requires working knowledge of DYL 280, MARK V, Fourth Generation language and 3-5 years experience.

SENIOR PROGRAMMING ANALYST

Project management, dialog Management PL/1 and CList. Requires strong technical understanding of IBM systems software in an MVS environment, BS degree in Computer Science or related discipline, and a minimum of 5 years programming experience. Assembler and SAS preferred.

IMS SYSTEMS PROGRAMMERS

Develop, design and use IMS on-line systems in our progressive multi-CPU environment. Troubleshoot, tune, install and maintain an IBM (DB/DC) system. Familiarity with MARK V, COBOL, TSO/SPF or ADF preferred.

DEC OFFICE AUTOMATION SUPPORT

DEC VMS All-in-1 expertise, and WPS Plus, DECcalc, DECgraph and VAX Rdb/VMS. Requires excellent user skills, and aptitude for assisting new users with office automation, and 3-5 years end-user support experience. Background in quantifying the benefits of office automation is a plus.

IBM EQUIPMENT CONFIGURATION SPECIALISTS

Equipment evaluation, acquisition recommendations, configuration design, and installation design for all types of central site IBM data processing equipment. Monitor site facilities planning, equipment, and inventory tracking.

LOGISTICS MIS DEVELOPMENT SPECIALISTS

Senior Specialists to evaluate, analyze, design and support large scale IMS DB/DC based Logistic Support Systems, determine the feasibility and impact of user requirements, and provide consulting services for an applications programming staff.

- **Provisioning/Spares Order Specialist:** Requires 8-10 years computer system experience including 2 years with Supply Support Systems, and working knowledge of MIL-STD-1388-1A/2A, MIL-STD-1552, and MIL-STD-1561A.
- **Logistics Support Analysis Specialist:** Requires 8-10 years computer system experience including 2 years with LSA Engineering Systems, and working knowledge of MIL-STD-1388-1A/2A.

Northrop provides its employees a competitive, comprehensive benefits package. Please send your resume to: **Bill Hargen, Northrop Advanced Systems Division, Employment Office, Dept. CW2509, P.O. Box 1138, Pico Rivera, CA 90660-9977.**

Modem Users: You can access a complete listing of career positions now available with your home computer and a modem. Dial **(213) 938-5532** for 24-hour, up-to-the minute information through our unique Career Access program. If you have not been able to reach our Career Access System, please try calling again. We have been very busy due to the overwhelming response.

Bit settings: data 7, stops 2, no parity, full duplex 300/1200 baud (CR) upon entry.

CAREER ACCESS™

PROOF OF U.S. CITIZENSHIP REQUIRED. **Northrop is an Equal Opportunity Employer M/F/H/V.**

NORTHROP

Advanced Systems Division

DATA PROCESSING OPPORTUNITIES

Our State-of-the-Art Facility Keeps You Current With Today's Technology

It takes a sophisticated data processing shop to keep one of the world's largest financial institutions on-line. A shop like the one we have at Manufacturers Hanover. We're currently looking for individuals with the following expertise who are interested in undertaking extraordinary challenges:

SYSTEM SPECIALIST

You will design, develop, and test financial applications for new product offerings as well as maintain and enhance existing systems. 3-5 years' experience, preferably in financial services, and an in-depth understanding of MS/DOS and "C" or PASCAL are required. Background with complex systems development projects, including full project lifecycle development, is necessary.

SENIOR PROGRAMMER ANALYST

Utilizing FORTRAN and Relational Databases, you'll design and develop database management systems on a minicomputer for a telecommunications application. Prior experience troubleshooting hardware and software, as well as diversified application knowledge are required.

PROGRAMMER ANALYST

Using IDMS/Batch, MVS and COBOL, you'll work on the gamut of financial applications. You must possess 3-4 years' experience, with at least 1 year working with IDMS.

SENIOR SYSTEMS TECHNICAL OFFICER—
Database/Expert Systems

Qualified candidates are those with 3-5 years' experience working with D.B. theory, relational, D.B. and D.B. design and realtime D.B.

SENIOR SYSTEMS ENGINEER/SYSTEMS PROGRAMMER

Working on a VAX/VMS operating system, you'll program in "C" and ASSEMBLER. Prior Decnet and Ethernet troubleshooting experience is required.

SENIOR PROGRAMMER ANALYSTS—
Hicksville, L.I. Location

It will be your responsibility to learn all aspects of consumer credit so that you can maintain our personal loan system. 2-3 years' experience programming in COBOL and ASSEMBLER are required, as is background coding on-line and batch programs. You must be able to write documentation problem-solving and design specs.

PROJECT LEADER—
Hicksville, L.I. Location

Meeting with users, you'll analyze their business needs and will coordinate coding/Tech efforts. Preparing functional and design specs will also be entailed. To qualify, you must have strong on-line communication skills backed by 5 + years' systems design experience. Familiarity with UNIX O/S and "C" programming are essential.

SENIOR PROGRAMMER—
Hicksville, L.I. Location

You'll deal extensively with the design team and will be involved with coding and testing modular multi-user micro-based systems. Coding in "C" under UNIX O/S will also be entailed. Qualified candidates will have 2 + years' programming experience in UNIX O/S and "C".

The professional advantáges of working in the Manufacturers Hanover environment cannot be understated. Manufacturers Hanover is thoroughly committed to the education and training of our computer professionals. In addition, you can look forward to a compensation package fully commensurate with your experience and responsibilities. For prompt and confidential consideration, forward your resume with salary requirement and an indication of position of interest, or call:

212-623-0891
Carol Fiorella
Assistant Manager
Information Technology Planning Department
MANUFACTURERS HANOVER
4 New York Plaza, New York, New York 10015

An Equal Opportunity Employer M/F

MANUFACTURERS HANOVER

APPLICATION INSTALLATION MANAGER

St. Francis Regional Medical Center, an 800 bed acute-care regional referral center located in Wichita, Kansas, is seeking an Application Installation Manager to work within a large IBM environment. The responsibilities of this position are managing/directing a staff of project leaders, system analysts, program analysts and programmers in the development and/or installation of application software projects. Maintaining production applications in a manner consistent with user requirements, administrative directives and mandated change.

Qualified candidates must have a Bachelors in computer science or related field with at least 2 years management experience and 8 years DP experience primarily in a hospital. St. Francis is offering a commensurate salary and competitive benefit package. Send resume in confidence or call collect to:

Tom Schreiber
Human Resource Supervisor
ST. FRANCIS REGIONAL MEDICAL CENTER
EMPLOYMENT CENTER
P.O. Box 1358
Wichita, KS 67201
(316) 268-5191

EQUAL OPPORTUNITY EMPLOYER

ST. FRANCIS
REGIONAL
MEDICAL CENTER
WICHITA, KANSAS

DATA PROCESSING OPPORTUNITIES
1-800-423-5383

Our clients in the **SUNBELT** and throughout the U.S. have **HUNDREDS** of current needs.

LIFE/70 or LIFECOMM	To $60K
SYSTEM/38 RPGIII	To $40K
DATA COMMUNICATIONS	To $64K
IDMS, IMS or ADABAS DBA's	To $50K
P/A (IBM COBOL or ALC)	To $40K
CONSULTING	$ OPEN
TELEPHONY, PBX	To $50K
SOFTWARE ENGINEERS	To $45K
PMS INSURANCE PKG	To $40K
LIFE INSURANCE	To $50K +
MVS INTERNALS	$ OPEN
ACF/VTAM/NCP	To $50K
DATACOM/IDEAL	To $45K

Call or send your resume to:

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. S
Houston, Texas 77289-0723
In Texas Call: 713/488-7961

PROGRAMMER/ANALYSTS

Salaries to $40K. Challenging opportunities nationwide. Excellent benefits/relocation package. Minimum 1½ - 2 years experience with leadership qualities. Skilled in one of the following:

- **IMS DB/DC**
- **CICS with DL/1**
- **IDMS ADS/O**
- **DEC VAX, RSX11**

Please call or send resume in confidence to:

N. Scott, VP
E.M. Madden Co., Inc.
P.O. Box 369
Williamstown, MA 01267
(518) 658-2719

Software Systems Specialist

Support IMS systems software. Requires Bachelors or equivalent in data processing, computer science or math (or equivalent experience - nine months equals one academic year) and four years experience including IMS, DB/DC FASTPATH, MVS, VTAM, problem resolution, performance and tuning, DB design and capacity planning. Salary is $4,166. per month. Job location in Los Angeles.

Resume to CW-B4845,
Computerworld, Box 9171,
Framingham, MA 01701-9171

ACP applications programmer/analyst to analyze, evaluate, design, implement, & maintain ACP/TPF based airline reservation application systs. Project management, consulting in various areas of airline reservation systs. Supervise 4 employees. Req's BS or equiv. in Comp. Sci. or Data Processing related field (math, bus., eng., chem., etc.) or equiv may be where Individual may be deemed to have equiv of BS based on professional experience in computer field alone. Must have good working knowledge of ACP/TPF, OS/VS2, MVS, Assembler, CMS, PL/I, + exp in IBM 308X, 303X, 370. Sal: $43,000-$48,000. Job site/interview: El Segundo. Send this ad and your resume to Dedra Howling, Personnel Relations, CCS Automation Systems, Inc., 101 Continental Blvd., Suite 200, El Segundo, CA 90245.

IBM S/38 PROGRAMMER/ANALYSTS

If you have 1+ years S/38 experience, and we have not called YOU, WHY WAIT? CALL US!

THE S/38 SPECIALISTS
JIM LEA OR HAZEL RASH
COLLECT AT (919) 222-0490

OR SEND RESUME IN CONFIDENCE TO:

PERSONNEL PLACEMENT, INC.
P.O. BOX 1815
BURLINGTON, N.C. 27216-1815

SALARIES from $20,000 to $50,000

All fees paid by
our client companies!

SYSOREX INFORMATION SYSTEMS, Inc., is recognized as a leader in the development and management of large, integrated computer and communication systems. We are a California company now expanding our operations in the WASHINGTON, D.C. area and are currently seeking talented professionals to assist in implementing a new, nationwide IBM-TPF based communications replacement system.

ACP/TPF SYSTEMS PROGRAMMER

Minimum of 3-5 years experience in ACP/TPF systems programming. Must have in-depth knowledge of TPF internals and be experienced in the TPF generation and installation procedures.

ACP/TPF APPLICATIONS PROGRAMMER

Minimum of 5 years experience in development programming and a minimum of 3 years experience in IBM Assembler language and a working knowledge of ANSI COBOL. Must have knowledge of quality assurance testing practices. Minimum of 2 years ACP/TPF experience is required.

SYSOREX provides medical, dental, life insurance and disability insurance at no cost to employees or their families, plus profit sharing. Qualified candidates should send their resume, indicating position for which they are applying, with current salary, to Professional Employment, Dept. CW-10/20, SYSOREX INFORMATION SYSTEMS, Inc., 3 Skyline Place, 5201 Leesburg Pike, Falls Church, VA 22041. An equal opportunity employer. INDIVIDUALS ONLY, PLEASE.

SYSOREX
Sysorex Information Systems, Inc.

LET'S GO!!
CONSULTING

Permanent staff positions or temporary assignments
Various applications with or without DB or DC experience.

HOT NEEDS!!!

- **ENTREX, ACP, PARS, TPF**

PMS (Policy Management Systems)

- CICS
- BAL
- IMS
- IMS DB/DC
- IDMS ADS/O
- DM IV
- APL
- GCOS (Internals)
- FOCUS
- FORTRAN
- VAX
- WANG VS
- PAC BASE

Offices & Assignments in major cities

COMPDATA

The Talent Market
1016 W. Ninth Ave.
King of Prussia, PA 19406
(215) 265-8979

CONSULTANTS

Leading Consulting Company

Very Hi Rates

PIOS Software

PRINCETON
INFORMATION, LTD

2 Penn Plaza, NY, NY 10001

(212) 563-5030 (201) 622-6138

PROGRAMMER
VTAM NCP SYSTEM
PROG
** $45,000 **

Government agency has a challenging systems programming oppty to install & upgrade VTAM NCP products. Flexible hours - choose 8-4; or 9-5. Earn top dollar without marrying your job. Full comprehensive bnfts. Fee Paid.

ROBERT HALF
OF NEW YORK, Inc.
522 Fifth Avenue
New York, NY 10036
212-221-6500

ENGINEER, Systems (Chemical). Applies principles of chemical engnrg, I.C. fabrication technology and Fortran programming to develop specialized software for IBM Series Computer. Req. M.S. in Chemical Engnrg, or operations engnr, plus 9 mos. exp. on the job, or 9 mos. exp. in computer simulation of chemical processes. Salary $32,000 per anum. D.O.T. 008061018. Send resume to NYS Job Service, J.O. #8012246, 485 5th Ave., N.Y., N.Y. 10017. No phone calls.

MAINE - N.H.

We have specialized in data processing professional placement in Maine & N.H. for a fifth of a century. If you qualify for positions in the $25-50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC®

Att: Dept. 2
P.O. Box 7040 DTS
Portland, Maine 04112
(207) 773-4749

SALES REPRESENTATIVES

Applied Computer Sciences (ACS) Is a growing manufacturer/VAR of high quality WANG compatible peripherals seeking sales professionals to represent our products in Boston, Chicago, Houston and greater New York. Required skills include familiarity with Wang equipment, knowledge of current printer technology, ability to interface with Fortune 500 companies and strong desire to succeed. ACS offers a competitive salary and benefits. Send confidential resume to:

Applied Computer Sciences
12910 Totem Lake Blvd., Ste. 100
Kirkland, WA 98034
Attn: Sales Representatives

Programmer/Analyst (syst) ACP/PARS TPF systems (airline control, fares, ticketing, & reservation) to analyze data, design, develop, test, implement syst. IBM mainframes using IBM assembler, MVS. BS or equiv in Comp Sci, or Data Processing related field, includes as equivalents situations where an Individual may have a degree in another area such as math, bus, eng, chem, etc. Req's 3 yrs min exp as syst analyst/-programmer. Sal: $42,000/yr. Job site/-interview: El Segundo. Send this ad and your resume to Dedra Howling, Personnel Relations, CCS Automation Systems, Inc., 101 Continental Blvd., Suite 200, El Segundo, CA 90245.

A fast growing Southwest Florida Electric Utility is looking for:

PROGRAMMER/ANALYST

Requires a Bachelor's Degree in Computer Science, two years experience as a Programmer/Analyst with a working knowledge of VAX 11 and in COBOL, VMS, BASIC, DIBOL and FMS.

SYSTEMS PROGRAMMER

Requires a college degree with emphasis in general business, accounting and/ or EDP, 4 years experience in performing technical support services which includes VAX 11/785 system software for COBOL, VMS, BASIC, DIBOL, FORTRAN, FMS and good data communications knowledge.

If interested, send resume and salary requirements to:

P. O. Box 3455
N. Ft. Myers, FL 33918-3455

EOE/AA

HOW VALUABLE ARE YOU?

The three most important factors in seeking a career change are ***job satisfaction, upward mobility, and money.*** We primarily work with a select group of "Fortune 500" companies throughout the Southeast who offer all of the above not to mention dental, savings plans, and many more. Our objective is to match not only your technical skills but your personalities with our clients.

You will be represented on a one-to-one basis which completely eliminates the mass mailing of your resume. We seek DP professionals who have at least 2 yrs. exp. with IBM or mini computers. If you want to know your true market value and desire to be represented by a well established agency with over 6 yrs. exp., ***please call Robert Montgomery collect at 919-847-3093 or send resume to:***

The Data Group
7317 Mill Ridge Road
Raleigh, NC 27612

BIG BUCKS... WARM WEATHER

An unbeatable combination. Our client, a SOUTH FLORIDA IBM 3090 installation, has numerous INHOUSE and CONSULTING POSITIONS. If you possess **any** of the following experience, call us today. It's your first step towards the beach!

MSA IDMS CICS

305-962-9444

EXECUTIVE DIRECTIONS, INC.
450 N. Park Road #302
Hollywood, FL 33021

CONTRACTORS NEEDED NOW

- **FOCUS (1 yr contract)**
- **CICS DL/1**
- **ADABAS NATURAL**
- **IDMS ADSO**
- **MSA**
- **S38**

CALL OR SEND RESUME

ROGER SETZER OR
GENE MCVEY

DP PROS, INC.

P.O. BOX 1815
BURLINGTON, NC 27216-1815
(919) 222-8030

SYSTEM 38 OPPORTUNITIES in the MID-SOUTH

Multiple clients seeking all levels of System 38 experience. All fees employer paid. Call or write Dot Gilbertson at

DEMPSEY PERSONNEL INC.
5050 Poplar Ave., #730
Memphis, Tn. 38157
Phone (901) 685-5456

When you don't have time to find the job you want

Searching for a better job can be a full time job. That's why so many data processors, who want to make a change, don't. Or worse, they take the next job offer that comes along.

If you can relate to this problem, Robert Half-Data Processing may be just perfect for you.

We're sensitive to the problem of the data processing professional, who wants to be fair to the present employer, and at the same time finds it necessary for career advancement to look for another job. Robert Half has been successful at discretely locating the right career positions for data processors—ever since the computer revolution began.

We can help you just as we've helped thousands of other professionals for almost 40 years.

If you must make a change, but can't spare the time for an interview during work hours, just call one of our 100 offices on three continents during a regular work day. Briefly explain your problem to one of our placement professionals, and we'll set up an in-depth phone interview at your convenience—after hours or on the weekend. If it's convenient for you to meet with us, so much the better—we'll arrange the interview.

And if you don't have a current resume, we'll discuss all the pertinent facts with you and compile them for presentation to suitable employers.

Please understand this: Our service is 100% free to you. And, equally as important, we're success oriented. This means our clients only pay our fees when they hire through us. This makes us better. *A lot better.*

So, if you're interested in finding a better data processing job, call one of our nearby offices. A few moments of your time now, may be the beginning of a new and brighter future. .

ROBERT HALF® DATA PROCESSING

© 1986 Robert Hall International Inc.
Offices independently owned and operated.

Analytical Systems Engineer wanted to design, develop, implement and document consignment inventory systems, customer release requirement systems and state of the art computerized manufacturing systems on Burroughs B6900 and B7900 mainframes using COGEN, FORTRAN, ALGOL, COBOL, DATA Management Systems II, GEMCOS, CANDE, workflow language and Communications Operating Management Systems; Requires M.S. Degree in Civil Engineering and one year related experience as a Software Engineer; $29,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202 Ref. #61686 "Employer Paid Ad".

ONLINE & DATABASE ATLANTA & SOUTHEAST

$25,000 to $60,000

Need Programmers, Programmer/Analysts and Contract Programmers for IBM Shops. Relocation Expenses Paid.

Send resume to:

Jim Heard
EDP Consultants, Inc.
3067 Bunker Hill Road,
Suite 202
Marietta, Georgia 30062
404-971-7281

DATA LINK

COME TO NEW ENGLAND!

Enjoy skiing, sailing, mountains, beaches, a Currier and Ives atmosphere, and a professional climate that is very exciting. If you have any experience in MIS/Engineering/Aerospace/Defense Industries, our clients want to see you. Our client positions range from junior level through senior management.

Send us your resume or call, and let DATA LINK introduce you to New England.

Our list of client companies is endless, and all fees, interviews and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-5400

SPERRY

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers-Let us update you on the rapidly changing Sperry market coast to coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNHILL OF ALBUQUERQUE, INC.

1717 Louisiana NE, Suite 218
Albuquerque, NM 87110
(505) 262-1871
Exclusively Employer Retained

SENIOR FIELD ENGINEER

Positions immediately available in dynamic sales and service company. Minimum of 3 years experience servicing DEC computer systems required. Excellent salary and benefits. For immediate consideration send resume to:

Southern Digital Services
5555 Oakbrook Pkwy., Ste. 250
Norcross, GA 30093
Attn: Field Service Manager

---

grow into tommorrow's technologies with faxon

Faxon, an international leader in library information services, is currently looking for a

manager of systems development

Ideal opportunity for an ambitious, take-charge individual with state-of-the-art technical knowledge. In this high visibility position, you will take on a variety of managerial duties for a staff of over 20 people. To qualify, you must have 7-10 years background in systems development and experience on large IBM mainframes. Excellent working knowledge of PL 1, COBOL, CICS, and IMS is also necessary. Bachelor's degree is required, preferably in Computer Science, Master's degree a real plus.

Faxon offers a generous compensation package including competitive salary and outstanding benefits. Please send resume to: Recruiter.

faxon

the faxon company, inc.
15 southwest park
westwood, ma 02090
Equal Opportunity Employer M/F

SOFTWARE OPPORTUNITIES

MIDDLE SOUTH SERVICES, INC., the technical service subsidiary of the Middle South Utilities System, has excellent opportunites for qualified professionals at our Control Center in Arkansas and MIS facility in New Orleans. Software professionals with a background in the following areas are needed to broaden and strengthen the support provided to management and System Companies:

REAL-TIME APPLICATIONS ANALYST

We are currently installing a new CDC Energy Management System in Arkansas. We require an individual with a BS degree in Computer Science, Math or Electrical Engineering and four years experience in POWER SYSTEMS network analysis software in a real-time environment. A strong background in Fortran is required; Assembly language is desirable.

ANALYST/PROGRAMMER

The position involves working as a team member developing highly complex Data Base oriented business applications. The position requires the ability to take an application completely through the development cycle. Technical expertise should include experience in Cobol, TSO/ISPF, and IMS DB/DC. Exposure to 4th GL is considered a strong plus.

DATA BASE ANALYST

The position involves designing and implementing physical data bases for in-house developed applications as well as implementing and tuning package applications. The position requires a thorough knowledge of IMS concepts with at least 3 years experience performing DBD, PSB, MFS, ACB gens. Knowledge of IMS utilities including reorganizations, recovery and SMU II is required.

Middle South Services, Inc. offers an exceptional Relocation Package including Relocation Allowance (One Month's Salary) ... Paid Moving Expenses ... Paid House Hunting Trip ... Mortgage Interest Differential plus Interim Living.

For more information on these positions, call our toll free number below, or to apply directly, send your resume to:

Joseph Hotard
MIDDLE SOUTH SERVICES, INC.
P.O. Box 61000
New Orleans, LA 70161
1-800-231-4481
In LA call collect (504) 569-5965

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F

Data Processing

Systemhouse

There's never been a better time to join us in:

Honolulu, HI **Salt Lake City, UT**
Olympia, WA **Phoenix, AZ**
Topeka, KS **Anchorage, AK**

Systemhouse is one of the largest and fastest growing systems integrators in the industry. By applying leading technologies to information problems, we've delivered some of the most complex and successful systems solutions to our clients.

Our dynamic growth has created opportunities for experienced and highly motivated professionals in the following areas:

Sr. Technical Consultants
Systems Analysts
Sr. Systems Analysts
Programmer Analysts
Sr. Programmer Analysts
Programmers

Requirements include experience in one or more of the following:

IBM BURROUGHS
TANDEM

Also required is experience in one or more of the following:

ADABAS NATURAL
LINC COBOL
CICS TAL
PATHWAY

Additional experience in any of the following areas is highly desirable:

Mini/Micros
Communications Protocols
Distributed Processing
Welfare Systems

All positions require relocation for 12-18 months.

For immediate consideration and to arrange an interview, send your résumé in confidence to: **Beth Jenkins, Systemhouse Inc., National Systems, Suite 500, Dept. CW-1, 1655 N. Fort Myer Drive, Arlington, VA 22209.**
An Equal Opportunity Employer.

BANKING SYSTEMS MANAGER

Expanding regional bank recently acquired a Pennsylvania subsidiary. Have immediate need for Retail Systems Mgr. to mge. mortgage & other loan systems. Req. strong banking bkgrd. +BA/BS degree. Excellent co. offers full relocation package to Eastern PA. To $55,000.

ROBERT HALF
OF BUFFALO, INC.
®

420 Main Street
1112 Liberty Building
Buffalo, NY 14202
(716) 842-0801
Personnel Agency

Your Connection To all levels of DATA PROCESSING PROFESSIONALS

NATIONWIDE

It only takes a call to Dunhill of Anderson to ascertain job opportunities available to Data Processing Professionals.

Our office specializes in locating experienced **● Programmers ● Programmer Analysts ● Systems Analysts ● Systems Programmers** for the most respected corporation in the nation.

We don't require an obligation and never charge a fee. All matters are held in strictest confidence.

Please mail resume to: Ammie **Thompson-CW** or **CALL COLLECT 1-803-224-7917**

Dunhill
OF ANDERSON INC

P.O. Box 2585
Anderson, SC 29622

CICS & SOFTWARE SYSTEMS PROGRAMMERS

Beautiful Scenery, Great Outdoor Recreation, Mild Weather, Short Commutes, Affordable Housing, Good Schools, and a Challenging Job with a Progressive Governmental Data Processing Consortium. The Lane County Regional Information System is recruiting for the position of System Programmer 2 to join a technical support staff that maintains a multi-CPU system including MVS/SP, JES2, ACF/-VTAM/NCP, CICS, TopSecret, ADR, SAS, and a locally developed terminal control monitor. For the CICS System Programmer position CICS systems support experience is required and experience with MVS/XA and DISOSS is very desirable. The Software System Programmer position requires excellent IBM/370 assembler programming skills and knowledge of MVS internals and task synchronization techniques. Salary range is $25,085 - $33,592 per year plus liberal employee benefits. Contact Lane County Personnel, 125 East 8th Ave., Eugene, OR 97401-2926, (503) 687-4171, to obtain required supplemental questionnaire. Filing deadline is 11/10/86. EOE.

Systems Programmer/Analyst (Aviation), to perform specialized studies, programming for the design and development of large scale, computerized flight planning system, including project plans & estimates. Serve as technical advisor to assigned group & consult on programming problems within department. Monitor project milestones & report status. Req's BS in Comp Sci, Data Processing or equivalent where individual may be deemed to have the equivalent of a BS degree based on professional experience in the computer field. Must be experienced in PL/I, IMS on IBM mainframes, JCL, VM/CMS. Sal: $40,600/yr. Job site/interview: El Segundo. Send this ad and your resume to Dedra Howling, Personnel Relations, CCS Automation Systems, Inc., 101 Continental Blvd., Suite 200, El Segundo, CA 90245.

SYSTEMS ANALYST

Systems analysis, design, debugging and conversion projects to Burroughs systems including mini systems (B-1900 series) and large mainframe systems (B6800 and B7900) COBOL, DMSII, GEMCOS and CANDE software packages utilized for development of these applications. 40 hour week, 9 to 5, $35,000 per year. BA degree Comp. Sci. or Business Administration. 2 years experience in job offered or 2 years experience analyst/programmer and/or systems analysis position. Experience must include 1 year experience with Burroughs system. DOT 012167066. Resume to NYS Job Service, JO #NY8029900, 175 Remsen St., 2nd Floor, Brooklyn, NY 11201.

DP MANAGER

S 38-New Installation We are looking for a Programmer Analyst who is ready to move up to the top position S 38 Model 8 with 4 meg running MAPICs applications Salary will be $33-38.000 plus bonus

Resource
Placement
Group
III

Contact Paul Martin
1-800-255-2255
Ask for Ext RPG3

Division of City & Nat l Employment Inc
P O Box 83
Waterloo IA 50704

D.P. SOFTWARE PROS CAREER INVITATIONAL

SATURDAY, OCTOBER 25th, 9AM-12 NOON

COMPUTER ASSOCIATES WORLD HEADQUARTERS 711 STEWART AVENUE, GARDEN CITY, L.I.

CA has achieved, in our tenth anniversary year, revenue of $191 million for fiscal year ended 3/31/86; a gross increase of 48% over fiscal year '85.

To prepare us for even greater growth and achievement in the decade ahead, we are actively searching for D.P. Software Professionals in the following areas of specialization. Join us in serving a customer base that represents 80% of the Fortune 500 industrial corporations.

SYSTEMS PROGRAMMERS

MVS Systems Programmers: BAL; Dump Reading; MVS System Control Blocks; TSO; MVS/SP or MVS/XA ... **DOS Systems Programmers:** BAL; Dump Reading; DOS utilities; knowledge of DOS Control Blocks; DOS/VSE and/or VSE/SP ... **Programmer Productivity software products maintenance, enhancement and new development:** IBM Assembler language on DOS, MVS, CMS operating systems ... **VM Systems Programmers:** 5 years' IBM D.P. experience plus 2 years' VM; Maintenance and installation using VM/HPO, RSCS networking, IOCP on 308X and 438X processors, EXEC2 and REXX ... **"C" Programmers:** 2 years' "C" and Assembler language; mainframe experience and IBM operating environment experience a plus.

APPLICATIONS PROGRAMMERS/SALES/SUPPORT

Assembler Programmers with database background with DB2, IDMS, ADABAS, Datacom ... Sales/Applications Support Reps: Professionals with accounting experience provide client support and implementation in IBM mainframe environment; CPA a plus ... Telemarketing Specialists with proven track record.

SYSTEMS ENGINEERS

Experience with MVS/DOS/VM and working knowledge of one or more of the following: Installation and maintenance of software products SMP/MSHP ... Scheduling/Tape and Disk Management/Job Costing/Security Packages ... Report Writers with CICS/Programmer Productivity Packages/COBOL.

(These positions require on-site customer visits)

QUALITY ASSURANCE

3 years' COBOL experience; VM/CMS; strong commitment to QA field.

Join us. Meet our Project Management staff. View our worldwide operations via video. Tour our corporate headquarters. We will greet you at the far right side entrance - closest to Stewart Avenue; offer you refreshments; and present you with career opportunities key to your future and our pursuit of quality and excellence. For driving and travelling information, please call our Personnel Department:

516/227-3300, ext. 7385.

An Equal Opportunity Employer M/F/V/H

COMPUTER ASSOCIATES
Software superior by design

Get your money's worth. Computerworld will lower your cost-per-hire.

When you're looking to fill MIS/DP positions, there's really only one place you need to advertise. Computerworld.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less.

Over 600,000 computer-involved professionals receive Computerworld every week. That's more than any other computer trade journal, business publication, or general-interest magazine.

Computerworld delivers quality readership, too. Fully 41% of our subscribers read Computerworld's recruitment section every week. And 95% of our subscribers read this section regularly. The openings they advertised for cover the whole gamut of MIS/DP positions -- including systems analysts, computer science & software engineers, directors of MIS/DP, programmers, sales managers, and systems managers.

As a matter of fact, recruitment advertising has made Computerworld the national leader in classified advertising among specialized business publications (according to *Business Marketing* magazine).

Compare costs and the people reached. You'll find that Computerworld is the number one medium for computer-related recruitment advertising.

COMPUTERWORLD
Classified Advertising
P.O. Box 9171
375 Cochituate Road
Framingham, MA 01701-9171

MITRE

System Engineering

C^3I Careers with Global Significance

As a System Engineer at The MITRE Corporation, the significance of your engineering career will increase. The immense importance of our work, providing engineering expertise for America's and The Free World's Command, Control, Communications and Intelligencie (C^3I) systems, offers you truly vital projects having significant impact on the large scale electronic systems of the future.

Artificial intelligence, fiber optics, over-the-horizon radar, data encryption and security, local area networks, and civil programs involving air transportation and advanced information systems are just some of the 150 projects underway at MITRE's suburban Washington, D.C. and Boston locations.

The significance of MITRE's work will become quickly apparent when you discover the finest professional environment of your career, the close contact you'll have with world-leading experts, and the unparalleled resources to support your best work. You'll also enjoy outstanding opportunity for project mobility, advancement through MITRE's dual career ladder program, and education programs featuring 100% tuition advancement and the unique MITRE Institute.

If you have a personal computer or terminal with a telephone connection, explore MITRE's opportunities in Massachusetts on line by calling (617) 271-8000. Use the login name 'mitre' followed by a carriage return. For information about defense and civilian opportunities in the Washington area call 1-800-336-0430.

An Equal Opportunity Employer

BOSTON
Please send your resume to:
David L. Finnegan
The MITRE Corporation
5610 Middlesex Turnpike
Bedford, MA 01730

WASHINGTON
Please send your resume to:
M.P. Mason
The MITRE Corporation
7525 Colshire Drive
McLean, VA 22102

Radar Systems

Digital Signal Processing • Radar System Surveillance Techniques • Radar System Analyses • Anti Jam Analyses • Intelligence Operations Analyses • Embedded Computer Hardware and Software

System Software

On VM • CMS • VCNA • RSCS • VS1 • RSTS • RSX 11-M • UNIX • VAX/VMS • Design, Implement and Document System Software • Performance Monitoring • Software and Hardware Evaluations • Enhance User Facilities • Applications Software—Corporate, Financial & Administrative Applications; MVS/COMPLETE/ADABAS Environment; PL/1 & NATURAL Programming Languages

Software Technology

Knowledge Based Expert Systems • Automatic Programming • Fault Tolerant Systems • Reusable Software

Software Engineering

Prototype Development • Performance Simulation • Ada Compiler Evaluation • Software Cost Estimation • Project Management Tools • Artifcial Intelligence

Civil Programs
McLean, VA Only

Computer Systems Architecture & Engineering • Systems Acquisition Management • Systems Planning & Analysis • Requirements Analysis & Definition • Computer Technology • Real-Time Computer Software Analysis & Sizing • Display Technology • Bus-Oriented System Architectures • Local Network Design • Radar System Design

Communications

System Design and Analyses • Digital Communications • Microprocessor Applications • Communications Processors (Hardware and Software) • Local Area Network • Protocol Development/Evaluation • Modulation/Coding Techniques • Secure Communications • Systems Test and Evaluation • Switching and Control Systems • Satellite and Terrestrial Transmission • Survivability/Vulnerability and Electromagnetic Pulse • Line of Sight, Tropo, Millimeter Wave and Fiber-Optics

Command And Control

Air Defense Systems (Deployable and Fixed) • Tactical Air Traffic Control Systems (Deployable and Fixed) • Foreign Air Command and Control • Missile Warning Systems • Satellite Surveillance Systems • Systems Analyses and Specifications • Software Development

Computer Systems

Requirements Analyses • Systems Analyses • Technology Assessment • System Acquisition • Performance Analyses • Simulation and Analytical Modeling • Artificial Intelligence • Image Processing • Fault Tolerant Systems • Ada • Software Cost Estimation • Computer Security • Software Metrics • Distributed Data Base Systems • Program Verification

Systems Architecture

Advanced Systems Design • Advanced Planning • Intersystems Engineering • Functional/Operational Analyses • Systems Inter-Operability • Cost Analyses

U.S. CITIZENSHIP REQUIRED.

Technical Challenge, Quality Lifestyle... you'll find both with SAIC in San Diego.

Science Applications International Corporation, a San Diego based R&D firm with over 6,500 employees and annual sales exceeding $525M, is a nationally recognized leader in high technology development and application, support services, and systems integration in the areas of national security energy, environment and health, and high technology products. We are seeking software professionals in a variety of applications with the following experience and qualifications:

SENIOR DATABASE ADMINISTRATOR

- 5 years experience as a DBA - at least 3 years in an IDMS environment.
- Experience with Fourth Generation Languages, Relational Data Base Systems, VAX based systems, and DEC-10.
- 5 years experience with business applications and software development

SENIOR PROGRAMMER / ANALYST

- 5 years experience developing business applications in an IBM environment.
- At least 2 years hands-on IDMS experience.
- Experience / knowledge of COBOL, large scale DBMS, INGRES, 1022, and XEROX (XBMS). Fourth generation languages a plus.

SYSTEMS DESIGN

- 3-5 years experience in system and programming design - preferably with large applications.
- Experience on TRIMIS, MUMPS, DEC hardware and medical applications desirable.

SYSTEMS ANALYST

- 3-5 years experience in telephone / land-line communications systems analysis.
- Experience with VAX / PDP-11, MUMPS language desirable.

These positions are located in San Diego, California and offer excellent career opportunity with strong growth potential. SAIC is a profitable, employee owned company offering an excellent salary and benefits package. For immediate, confidential consideration please submit resume and salary history to: **SAIC, P.O. Box 2351-FK, La Jolla, CA 92038.** Equal Opportunity Employer

SAIC™
Science Applications International Corporation

PROGRAMMER: ENGINEERING AND SCIENTIFIC/STAFF CONSULTANT: To consult with client to ascertain and define problem area(s). To determine scope of investigation required to obtain solution. To analyze client's data to recommend solution. To develop mathematical techniques and implement software for: collection, processing, and analysis of data from remote sensing apparatus and numerical/mathematical modeling applications of engineering problems. To perform realtime data acquisition and signal processing software for synthetic aperture radar. To maintain and develop general purpose commerical discrete element computer software. To use DEC, Prime, Celerity mini and CDC mainframe systems. To interface equipment for downlink of airborne, land based radar systems and for remote sensing equipment. To use Macro-II in particular with respect to control and interface with hardware equipment, Fortran and Pascal. To provide business development through client contact, to develop and present proposals for client projects. To manage and review projects including preparation of written technical reports. 40 hours per week. $35,000/year. Requires: PhD, in Physics and Mathematical Modeling, 4 years experience in software design and development in real time data acquisition and simulation applications using Pascal, Fortran, and Macro-II on DEC computer systems. Radar data acquisition and analysis. Software development for engineering applied physics applications. Resumes required. Apply to nearest Job Service Center. Refer to Job Order #CO2734019.

1000 DP Openings

ADR/DATACOM IDEAL Prog/Anal (2 yrs +)	25-32K
IDMS-ADS/D Prog/Anal (2 yrs +)	25-35K
IMS DB/DC Prog/Anal (1-5 yrs)	25-35K
ADABAS/NATURAL Prog/Anal (2 yrs +)	27-39K
CICS Prog/Anal (2-5 yrs)	25-35K
S/38 Prog/Anal (2-5 yrs RPG III or CDBDL)	24-33K
Tandem Prog/Anal (2-5 yrs)	24 35K
HP 3000 Prog/Anal (2-5 yrs)	25-30K
Retail Prog/Anal (2-5 yrs Retail or PDS Apps)	25-33K
Bank Prog/Anal (2-5 yrs Bank Apps)	24-33K
Mfg Prog/Anal (2-5 yrs Mfg Apps)	26-34K
Insurance Prog/Anal (2-5 yrs Ins Apps)	22-30K
MVS Sys Prog (1-5 yrs)	27-40K
CICS Sys Prog (2-5 yrs)	27-40K
VTAM/NCP Sys Prog (2 5 yrs)	26-40K
IMS or IDMS Sys Prog (2 5 yrs)	25-38K
Data Base Anal (2-7 yrs IMS, IDMS, or ADABAS)	35-45K
EDP Auditor (2-5 yrs EDP Audit)	26-39K

Largest employment agency in Charlotte, in business since 1975, one of the top 2 agencies in the most productive network in the country (NPC) since 1983, affiliated with 150 agencies from coast to coast Fee paid

Rick Young, CPC (704) 366-1800
Corporate Personnel
Consultants, Inc.
3705 Latrobe Drive Suite 310
Charlotte, N C 28211

Sometimes your own back yard isn't big enough.

If the professional you're looking for isn't in your own back yard, or you personally are looking for a new back yard, we can help you. We have been consulting with Data Processing professionals for over 22 years.

ROMAC® Offices

Albany, NY
Atlanta, GA
Bala Cynwyd, PA
Baltimore, MD
Boston, MA
Buffalo, NY
Charlotte, NC
Chicago, IL
Cleveland, OH
Columbus, OH
Dallas, TX
Dayton, OH
Denver, CO
Detroit, MI
Fort Lauderdale, FL
Hartford, CT
Houston, TX
Jacksonville, FL
Memphis, TN
Milford, CT
Milwaukee, WS
Minneapolis, MN
Orlando, FL
Paramus, NJ
Philadelphia, PA
Phoenix, AZ
Portland, ME
Portsmouth, NH
Providence, RI
Raleigh Durham, NC
Richmond, VA
Rochester, NY
St. Louis, MO
Tampa, FL
Washington, DC
Wellesley Hills, MA
Wilmington, DE
Winston-Salem, NC

See you at the D.P.M.A Convention in Atlanta. Booth #125

ROMAC®

DATA PROCESSING PROFESSIONALS

Growth Through Leadership

SCT is recognized nationally as the major source for the development of advanced software systems and management services for institutions of higher learning and government.

For more than 16 years, our goal has been to provide our clients with the highest levels of technical expertise to increase the cost efficiency and maximize the utilization of their D.P. efforts. Today, we're developing newer and even more efficient software packages to maintain our reputation as the leader and pace-setter in our industry.

We have excellent openings available at our suburban Philadelphia corporate headquarters and at client sites across the country.

- **PROJECT MANAGERS**
- **PROJECT LEADERS**
- **PROGRAMMER ANALYSTS IDMS/ADSO**
- **PROGRAMMER ANALYSTS COBOL/CICS**
- **DATA BASE ADMINISTRATORS**
- **SYSTEM PROGRAMMERS DOS/VSE, OS/MVS, MVS/XA, VM/CMS, CICS/TOTAL**
- **SYSTEM ANALYSTS**
- **CONSULTANTS Student Systems, Financial, Payroll/Personnel**
- **TELECOMMUNICATION SPECIALISTS**
- **MICROCOMPUTER SPECIALISTS**

SCT has excellent benefits including three weeks vacation first year, paid Medical, Dental and Life Insurance. If you possess the potential of taking a positive, leadership role in the growth of our company and your career, send your resume, with salary history and requirements, **or contact: Jim Styles or Theresa Hoopes, SCT, Great Valley Corp. Center, 4 Country View Road, Malvern, PA 19355. (800) 441-7247 or (215) 647-5930 in Pennsylvania.** An Equal Opportunity Employer, M/F.

SCT

Analysts, Programmers,
Software/Hardware Design Engineers

AWARD WINNING EMPLOYMENT AGENTS

at your service

RSVP SERVICES has been discreetly and effectively matching computer professionals and employers nationally since 1966

Member of National Personnel Associates (NPA, over 200 firms) and Mid-Atlantic Association of Personnel Consultants (MAAPC, over 100 firms). Winner of numerous awards since 1984: MAAPC Network Top Consultant and Runnerup, NPA Top Producers Club, 5 Times Quota Award, Top Twenty Producer (10th nationally) and Second Regional Producer.

To provide our best efforts, we can accept only ten of the many applications we receive each workday Services to applicants include development of resumes and selective submission to clients and affiliates cultivated over twenty years of doing business, arrangement of interviews and career guidance when requested, with no sales pressure

Our client companies pay our fees and seek well qualified, motivated, productive employees with good work histories and references. Other criteria include a 4-year college degree (some exceptions), two years of full-time applicable work experience up to project or group leader level, and marketable software, hardware or computer applications skills. Sorry, we can't help trainees, executives or aliens without permanent visas

If you qualify for our services and would like to explore career advancement, call 800-222-0153 or (in NJ) 609-667-4488, or send a resume with education, experience, salary, desired salary and location restrictions to either address:

RSVP SERVICES, Dept. C2
One Cherry Hill Mall, Suite 700
Cherry Hill, NJ 08002

RSVP SERVICES, Dept. C2
Dublin Hall, Suite 201
1777 Walton Road
Blue Bell, PA 19422 (mail address only)

RSVP SERVICES
Employment Agents for Computer Professionals

Data Processing Director to direct entire data processing function using systems design background. Defines equipment and systems needs and makes recommendations to management. Develop and implement new techniques for testing, modifying and maintaining existing software. Maintain project logs. Handles routine systems maintenance. Directs training of subordinates. Handles system upgrade, conversion and interface, including database creation and rewriting of software and menus as needed. Must have BS Computer Science plus 2 yrs. exp. or 4 yrs. exp. if no degree, strong background in systems conversion, technical writing ability and ability to develop and implement systems functions that will achieve long term goals. Hours Monday thru Friday 9am-5pm. Salary: $1,667/month. Job located in Miami. Apply to: Job Service of Florida, 1307 N. Monroe Street, Tallahassee, FL. Ref: Job Order No. FL5231479

Programmer/Analyst (SCEPTRE syst) for maintenance & eng. applications, airline parts & inventory, eng orders, work control items, mechanic write offs, time on parts, maint. alerts, etc. Analyze data, design, develop, code, test, implement, analyze uses and develop to user needs, user liaison, & documentation. IBM mainframes, IMS programming, IBM Assembler, COBOL, VTAM access. Req's 3 yrs min exp in SCEPTRE, + BS or equiv in Comp Sci or Data Processing related field (eng., bus., math, etc.) or where individual may be deemed to have equiv. of BS based on professional exp. in computer field alone. Sal: $42,000-$48,000/yr. Job site/interview: El Segundo. Send this ad and your resume to Dedra Howling, Personnel Relations, CCS Automation Systems, Inc., 101 Continental Blvd., Suite 200, El Segundo, CA 90245.

NY METROPOLITAN AREA

BANKING

IBM

- VP level. Data Communications. Network planner, SNA. 5 yrs exp.
- Syst Prog'r MVS IMS. 3 yrs exp.
- Sr level Prog'r CICS (Macro & Command), TCAM. 3 yrs exp.

DEC

- Prog'rs VAX BASIC. 2 yrs exp.

HONEYWELL

- GMAP, DMIV, 2 yrs exp.

Call 212-398-9891
or submit resume to:
HANK WALSH ASSOCIATES
16 W. 40 St., NY, NY 10018.

Analyst/ Programmer

Baymont Engineering Company requires an Analyst/Programmer to work with its two VAX Intergraph 11-785 Computer Systems along with the Intergraph 250 System and a VAX 11-751.

The successful candidate must possess:

- Two years of programming experience.
- Experience in the analysis and design of systems.
- Ability to fully document systems and procedures.
- Knowledge of FORTRAN essential.
- Intergraph System experience would be an asset.

Please send resume and salary history to:

Patricia J. Boyd
BAYMONT ENGINEERING CO.
14100 58th St. N.
Clearwater, FL 33520

Senior Systems Programmer - Duties: Production support of MVS and JES Computer operation system software and support of disaster contingency plan, performance tuning and trending support mainframe non-operating software, responsible for computer system security. Experience: Bachelor of Science in Mathematics/Physics or Computer Science. Five years experience as senior systems programmer. Must have received training in hardware structures, programming systems and programming. Familiarity with following hardware: CDC 6400/6600/ 7600/CY72; DEC PDP 11, AMDAHL 470V8, IBM 3032/308X/-3705/158; GEC 4080; ICL 1905F. Ability to utilize the following software in conjunction with applicable hardware listed above: CDC NOS/BE, SCOPE2, COMPASS and IBM OS/VSI, MVS Sp.1E, MVS SP1.3, JES 2. Location: El Segundo, California. Salary: $42,000 annually. Reply: Send this ad and your resume to Job Order #DC-8118, P.O. Box 9560, Sacramento, California, 95823-0560, not later than November 4, 1986. If offered employment, must show you have the legal right to work.

MAJOR MOTION PICTURE CO.

ims db/dc or cics exp,
focus a plus

p/a to $35K
sys/a to $42K

IMS CONV TO IDMS

megashop servicing hi-tech,
multi-div corporation.
3 yrs. ims db/dc bkgd will
get you training in idms.

Idms exp a big plus

to $45K

MULTI VAX SHOP

health care leader needs
cobol p/a to $38K
also
sys progs to $42K

TECHNICAL RECRUITMENT

3250 Wilshire Blvd., Suite 900
Los Angeles, CA 90010
(213) 464-8440

ATTN: DAVE ROWELL
RELOCATION NEGOTIABLE

Senior Systems Programmer: $2,500 per month. 1 year experience or 2 years systems programmer and MSCS. Knowledge of Burroughs computers and written verifiable references required. Design, coding, testing and debugging of MCPX operating system for Burroughs medium operating system. Design and code control card process and disk files security modules for next system. Job and interview site Pasadena, California. Send this ad and your resume to Job #NOF311, P.O. Box 9560, Sacramento, CA 95823-0560 not later than 11/4/86. If offered employment, must show you have legal right to work.

SYSTEMS ENGINEER: To provide support, maint dvlpmt & enhancement for Intercomm software sys operating under IBM 360/370 operating systems (OS/MVS); to manage computer resources & flow of data between users & multiple, on-line applications. Must have knowl of Intercomm architecture IBM OS/MVS & IBM VTAM to develop new features in product to allow program level communication between systems running INTERCOMM & CICS, using advanced features of IBM's VTAM. Install INTERCOMM systems resolving problems & providing customer support including, modification of product as necessary. Must plan & conduct courses in use of INTERCOMM. Must have BS in mathematics & 4 yrs exp as Systems Engineer. $44,500 per 40 hr wk. DOT 012-167-066. Send resume to: NYS Job Service Order #NY8028987, 97-45 Queens Blvd, Rego Park, NY 11374.

DATA PROCESSING PROFESSIONALS

Illinois Power Company, a progressive, medium-sized mid-western utility, has the following challenging opportunities. BS or BA in Computer Science, Computational Math, Business or a related field is preferred.

APPLICATIONS— PROGRAMMERS AND PROGRAMMER ANALYSTS

Requires 4-8 years experience in analysis or programming. COBOL necessary, with experience in CICS, IMS/DB, IBM's Data Dictionary, TSO/SPF, PANVALET, VSAM, IBM-Assembler, and structured design preferred. Identify needs, recommend software/hardware solutions, design programs and systems, assist in overseeing all phases of system development and implementation.

-ENVIRONMENT-

Our state-of-the-art environment features two large mainframes (3081 and 3090) with MVS/XA, JES2, CICS, ACF/VTAM, TSO/SPF, PANVALET, IMS/DB and SAS, as well as multiple mini and micro computers.

We are located 2 hours from St. Louis and 3 hours from Chicago in Central Illinois. Recreational facilities include parks, lakes, golf courses, health clubs, as well as cultural and educational opportunities. We offer excellent salaries and comprehensive fringe benefits.

For consideration, forward resume, including education, experience, personal and salary history, in confidence, to: S. R. Chilton.

ILLINOIS POWER COMPANY

500 South 27th Street
Decatur, Illinois 62525

An Equal Opportunity Employer M/F

OVER 600,000 CHANCES TO WIN!

Hiring a new employee is always a bit of a gamble, but when you advertise your job openings in Computerworld's classified pages, the odds are on your side.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less. Consider the facts:

1. More than 600,000 computer-involved professionals receive Computerworld every week. That's more than any other trade journal, business publication, or general magazine.
2. Our readers are the very people you're looking for. MIS/DP directors, systems analysts, programmers, and engineers -- as well as presidents, treasurers, and general managers.
3. Computerworld delivers quality readership. Fully 41% of our subscribers read Computerworld's recruitment section weekly. And 95% of our subscribers read this section regularly.

When you compare costs and the people reached, Computerworld is the number one medium for computer-related recruitment advertising. Place your ads today. You'll get the responses you're looking for. And you'll get them fast, because we accept ad materials up to 10 days before the issue date.

Simply call toll-free (800) 343-6474. In Massachusetts call (617) 879-0700. Call now.

COMPUTERWORLD
Classified Advertising
P.O. Box 9171
375 Cochituate Road
Framingham, MA 01710-9171

MIS Professionals

Maybe you've already got all the challenge you can handle. Maybe not.

Call Today

ADABAS
BASIC
BURROUGHS
"C"
CICS
CMS
COBOL
COPICS
dBASE II
DBMS
DMS
DOS/VSE
FOCUS
FORTRAN
GUARDIAN
HOGAN
HP
IBM
IBM PC
IDMS DB/DC
IMAGE
IMS DB/DC
LAN
MAPICS
MARK IV, V
MPE
MVS
NCP
NATURAL
NOMAD
OS
PATHWAY
PL/1
RAMIS
RPG II, III
SDLC
SNA
TAL
TANDEM
TPNS
UNIVAC
UNIX
VAX
VMS
VTAM

Join America's leading supplier of contract MIS professionals for systems and applications software related to transaction processing.

TAC EDP/Temps® and CONTRACT SERVICES

An Affirmative Action/Equal Opportunity Employer

BALTIMORE
7133 Rutherford Rd
Baltimore, MD 21207
(301) 265-6500

BOSTON
15-19 Crawford St.
Needham Hghts, MA 02194
(617) 449-6694
One Center Plaza
Boston, MA 02108
(617) 723-6111

CHICAGO
2115 Butterfield Rd.
Oak Brook, IL 60521
(312) 620-7171

CLEVELAND
1440 Snow Road
Parma, OH 44134
(216) 749-3060

DETROIT
17117 W. Nine Mile Road
Southfield, MI 48075
(313) 569-6560

LOS ANGELES
15445 Red Hill Ave.
Tustin, CA 92680
(714) 259-1850
800 S. Figueroa St.
Los Angeles, CA 90017
(213) 624-9810

NEW YORK
225 W 34th St.
New York, NY 10001
(212) 947-6033

ORLANDO
1001 Executive Center Dr.
Orlando, FL 32803
(305) 898-9027

PHILADELPHIA
301 City Line Ave.
Bala Cynwyd, PA 19004
(215) 667-2990

SAN FRANCISCO
901 Sneath Lane
San Bruno, CA 94066
(415) 952-5010

STAMFORD
37 North Ave.
Norwalk, CT 06851
(203) 847-6600

WASHINGTON, D.C.
2095 Chain Bridge Rd
Vienna, VA 22180
(703) 893-2400

© 1986 Technical Aid Corporation

Required by the

WORLD FOOD PROGRAMME

DATA PROCESSING SPECIALIST

at Rome Headquarters

The World Food Programme, (WFP) is in the process of introducing a complex transportation and accounting database to aid in its function of delivering food aid to developing countries. The system uses ADR DATACOMM/IDEAL software. A specialist with a minimum of 3 years experience is required to service the needs of database users.

The initial appointment will be for three years, with the possibility of extension. The starting salary, depending on qualifications and experience, will be US$ 21,260 to US$ 25,970 net tax free plus allowances, cost of living adjustment, education grant and other benefits of international civil service.

Send a detailed curriculum vitae quoting **VA WPD-86-11** not later than **10 November 1986** to Chief, WPXS, World Food Programme, Via Cristoforo Colombo 426, 00147 Rome, Italy.

RESEARCH ENGINEER/SYSTEMS PROGRAMMER (2)

The University of Illinois at Urbana-Champaign has immediate openings for two full-time academic professional Research Engineer/Systems Programmer(s) in the Coordinated Science Laboratory. The Coordinated Science Laboratory operates a computer facility with a Gould 9050, two VAX 11/780s, VAX 750, over two dozen Sun workstations and other miscellaneous minicomputers. Duties and responsibilities will include: 1) system software installation and maintenance; 2) consulting with faculty, staff and students users; and 3) training of student programmers and operators.

Minimum requirements include an MS degree in electrical engineering or computer science, at least four years experience with computer programming in at least three languages, and at least two years experience with the C programming language. The candidate must have experience with Berkeley Unix 4.2BSD systems internals, demonstrated ability to configure hardware systems and upgrades and ability to interact effectively with a broad spectrum of faculty and staff.

Minimum salary is $25,000; salary depends on qualifications. In order to ensure full consideration, applications must be received by November 15, 1986.

Send resumes including names of at least three individuals who can be contacted for references to Lorraine Selander, Assistant Director, Coordinated Science Laboratory, 1101 West Springfield, Urbana, Illinois 61801 (217) 333-2515.

The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

The best way to be your best : working at Apple.

EUROPEAN MIS IN PARIS is looking for a

SENIOR SYSTEMS ANALYST PROGRAMMER

responsible for :

- Recommending and improving applications for European Headquarters.
- Providing user training and technical support.

He will need to have :

- a strong technical background with experience of micro and/or mini-computer systems and telecommunications software,
- a good understanding of business financial systems,
- good communication skills in French and English,
- a personality that "makes things happen".

Based in PARIS with some travel he should have at least 5 years professional experience and a computer science degree, or business degree.

Please send resume, hand written letter and photograph to
CONTESSE PUBLICITE, réf. 13917
20, avenue de l'Opéra - 75040 Paris cedex 01.
Who will forward.

Apple®

CONTESSE

CICS/IMS/VSAM DP Series

CICS/VS Command Level Programming with COBOL Examples By David Lee $29.95
Used by 15,000 CICS programmers. Considered the best by many DP pros. Presents more examples, sample programs and techniques than the other two CICS books combined. 273 practical examples. 15 most important CICS applications, each is demonstrated by a sample CICS program. CICS mapset coding, Pseudo Conversational CICS program design, coding, testing and implementation. CICS Internal Table Setup, CEDF Debugging, CEMT and CSMT usage, Dump Reading, Production Abend Handling, Online report printing, Menu-driven, Data Entry, Inquire/Update, Browse, VSAM Alternate Index processing, Automatic Task Initiation and much more.

CICS/VS Online System Design and Implementation Techniques By David Lee $29.95
Just published! This book is a must for all CICS programmers and analysts who want to gain 3 years of heavy CICS experience within several months. It contains 4 parts. Part 1 covers CICS advanced features. Part 2 covers CICS design, testing and implementation techniques that you must know to survive in the real-life CICS environment. Part 3 lists 100 most common CICS application problems that a CICS programmer may encounter on a daily basis and their solutions. You can gain a lot of problem-solving experience instantly by having this list. Part 4 presents 15 most important CICS applications, each is demonstrated by a sample CICS program.

IMS/VS DB/DC Online Programming Using MFS and DL/I By David Lee $29.95
Published in '85. Used by 6000 IMS DB/DC programmers and adopted by AT&T. The only complete and practical IMS/VS DB/DC programming guide in the market. 245 practical examples. Nine major IMS DB/DC applications are presented. MFS format coding, MPP program design, coding, testing and implementation, BMP programming, BTS II Testing, Production Abend handling, and much more!

IMS/VS DL/I Programming with COBOL Examples By David Lee $29.95
This book covers all the basics of DL/I data base and DL/I batch programming with introduction to IMS DB/DC online programming 212 practical examples, 10 major IMS/VS applications, DL/I data base concepts, DL/I call usage, DL/I batch program design, coding, testing and implementation, DL/I JCL setup, BTS II Testing, Data Base Access Methods, DBDGEN and PSBGEN utility usage, Data base load, Logical Data Base and Secondary Index design and processing, and much more!

VSAM Coding in COBOL and VSAM AMS By David Lee $19.95
Become a VSAM expert in just one month! A practical guide for COBOL programmers using VSAM files. Fourteen major VSAM applications written in COBOL, 53 AMS examples to cover all types of VSAM file creation and maintenance. Many practical COBOL examples, and OS/VS or DOS/VS JCL on VSAM files. $17.95/copy (4 or more).

Order Your Copies Today! To order by credit card (VISA or M/C), call TOLL FREE 1-800-851-5072 or 214-248-7642 (In Texas). To save S&H charges, send $29.95/copy or $24.95/copy (4 or more copies) to the address below. Allow 1 to 2 weeks for delivery.

Unlimited Guarantee: Full Refund At Any Time If Not Satisfied.

CCD ONLINE

CCD ONLINE SYSTEMS, INC.
TOLL FREE 1-800-851-5072
16990 Dallas Parkway, Suite 151, Dallas, TX 75248

Project Leader - Responsible for overseeing the design and implementation of computer systems as leader of assigned project teams. Must possess experience in preparing technical reports and user manuals, as well as knowledge and experience with PASCAL, NOMAD, COBOL, FORTRAN, and FOCUS languages and GCOS, MVS/TSO and VM/CMS operating systems. Position requires Bachelor's degree or equivalent in computer science and 4 years experience in position or as programmer/analyst. 40 hour work week. Salary $43,500 per year. Place of employment and interviews - San Francisco, California. Send this ad and a resume to Job #CR8242, P.O. Box 9560, Sacramento, California 95823-0560 not later than November 5, 1986.

EDUCATION

EXPERIENCE COUNTS! NON-RESIDENTIAL DEGREE PROGRAMS

Professionals in any field may apply for at-a-distance Bachelor's, Master's or Doctoral degree programs in Management, documenting work experience instead of further classwork, and presenting a career accomplishment project instead of a standard thesis. The cost is moderate; the time for completion is shortened. Designed for working professionals. Program authorized by the California Department of Education. Students Worldwide.

CALIFORNIA UNIVERSITY
for ADVANCED STUDIES
School of Professional Management
Office of the Dean, Room C-2
100 Galli Drive
Novato, CA 94947 (415) 382-1600

"In recruitment, the bottom line is results – and that's what you get from Computerworld."

Janet Thompson
Management Supervisor
Bozell, Jacobs,
Kenyon & Eckhardt, Inc.

For over 10 years, Computerworld has been a primary recommendation of Janet Thompson, Management Supervisor for Bozell, Jacobs, Kenyon & Eckhardt, when it comes to recruiting data processing professionals. How did such a long relationship evolve?

"*Computerworld has proven itself to be the leader in terms of quality response and value for our clients' advertising dollar. In recruitment, the bottom line is results and that's what you get from Computerworld,*" according to Janet.

"*In a tradebook campaign for systems professionals, Computerworld outpulled the other books four to one. We're not only talking quantity, but also quality and the most hires.*" Janet continued, "*One of our key accounts traditionally uses newsprint. But they make an exception when it comes to the data processing field. They use Computerworld on a regular basis because of its excellent cost-per-hire results.*"

The recruitment staff of Bozell, Jacobs, Kenyon & Eckhardt has over 65 years experience in recruitment advertising. And they all share Janet's feeling. "*It's unanimous here. Computerworld is recognized as an essential medium for recruiting in the data processing arena. And it will continue to be a primary recommendation in the future.*"

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Janet.

For all the facts, call Al DeMille, National Sales Manager, at (617) 879-0700.

COMPUTERWORLD

375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171/(617) 879-0700

A PUBLICATION OF
CW COMMUNICATIONS

Computerworld Sales Offices

Publisher/Vice-President/Donald E. Fagan

VP/Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Michael F. Kelleher
District Managers/David Peterson, Bill Cadigan
Account Manager/Sherri Driscoll
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171

CHICAGO SALES OFFICE (312) 827-4433
Midwest Regional Manager/Russ Gerches
District Managers/Kevin McPherson, Larry Craven
Sales Assistant/Kathy Sullivant
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Fred Lo Sapio, Frank Genovese
Account Manager/Jennifer Lindsey
Sales Assistants/Mary Burke, Sue Larson
COMPUTERWORLD, Paramus Plaza I,
140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Bernie Hockswender, Carolyn Knox
Western Regional Director/William J. Healey
COMPUTERWORLD, 18004 Sky Park Circle, Suite 255,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Milione
District Managers/Ernie Chamberlain, Mark V. Glasner,
Account Manager/Diane Fuller
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
Sales Assistant/Melissa Christie
COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330,
Atlanta, GA 30319

DALLAS SALES OFFICE (214) 991-8366
District Manager/Mark V. Glasner
Western Regional Director/William J. Healey
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

CLASSIFIED ADVERTISING (617) 879-0700
National Recruitment Sales Manager/Al DeMille
COMPUTERWORLD, 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
CW INTERNATIONAL MARKETING SERVICES
Managing Director/Frank Cutitta
COMPUTERWORLD, 375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
(617) 879-0700

CW Communications/Inc.

Patrick J. McGovern
Board Chairman

Axel Leblois
Chairman/Chief Executive Officer
CWCI, Inc.

Tom Casalegno
President/Chief Operating Officer
CWCI, Inc.

Lee Vidmer
President
CWCI/Framingham

Publisher/Vice-President, Donald E. Fagan. Senior VP-Communication Services, Jack Edmonston.
VP-Sales, Edward P. Marecki. VP-Finance, William P. Murphy.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: (617) 879-0700, Telex: 95-1153, FAX: (617) 875-8931

SALES Vice President, Edward P. Marecki. Manager/Marketing & Sales Operations, Kathy Doyle. National Recruitment Sales Manager, Al DeMille. Display Advertising Manager, Carolyn Novack. Display Advertising, Maureen Carter, George W. Griffin, Mary Campo, Susan Thaxter. Classified Operations Manager, Cynthia Delany.
Director of Marketing Bob Singer

COMMUNICATION SERVICES Senior Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen.
Sales Promotion Director, Liz Johnson.

PRODUCTION Production Director, Peter Holm. Senior Production Manager, Leigh Swearingen. Paste-Up Manager, Patricia Gaudette. Typesetting Manager, Carol Polack.
Art Director, Tom Monahan.

CIRCULATION Circulation Director, Nancy L. Merritt.

CONFERENCE MGT. GROUP President, William R. Leitch.

MIS Corporate Director MIS, Jeff Cordeiro.

Foreign Editorial/Sales Offices

Argentina: Ruben Argento, CW Communications S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong, Phone: (011) 852 5 861 3238. Telex: (780) 72827 (COMWOR HX).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR).

Austria: Dr. Manfred Weiss, CW Publikationen Verlagsgesellschaft m.b.H., Josefstadter Strasse 74, A-1080 Wien, Austria. Phone: (011) 02 22 48 65910. Telex: (847) 115 542 (SCH/A).

Brazil: Ney Kruel, Computerworld do Brazil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30838.

Denmark: Preben Engell, Computerworld Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (855) 31566.

France: Jean-Louis Rendon, Computerworld Communications S.A., 185 Avenue Charles De - Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F.

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Budapest 1536 PF386, Hungary. Telex: (861) 224876.

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432. Telex: (843) 335318.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (011) 81 3 551 3882. Telex: (781) 252-4217 (Computerworld Japan only).

Steven Yamada, Tokyo Representative Corp., Sanshin Kogyo Jimbocho 3F, Chiyoda-ku, Tokyo 101, Japan. Phone: (011) 81 3 230-4117/4118. Telex: (781) J26860 (reps for all CWCI publications except Computerworld Japan).

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Reg Birchfield, CW Communications Ltd., Computerworld New Zealand, 13 Grey Inn, Auckland 1, New Zealand. Phone: (011) 649 764993.

Norway: Mr. Morton Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (011) 31 20 647725. Telex: (856) 76476 (CW NOR N).

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Gun Road, P.O. Box 750, Beijing 100039, People's Republic of China. Phone: (011) (47) 814 6174. Telex: (716) 222214 (CCW CN).

Spain: Francisco Zababa, Computerworld/Espana, Barquillo 21 28004 Madrid, Spain. Phone: (011) 34 1 231 23 85/86. Telex: (831) 47894 (CW E).

Sweden: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8 67 91 80. Telex: (854) 14904 9 (NOVACW).

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816710.

Taiwan: Grace Tang, ACE Media Agency Ltd., Room 503, 1, Fu Hsin S. Road, Sec. 1, Taipei, 10587, Taiwan, R.O.C. Phone: (02) 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

United Kingdom: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WCI 8UT, United Kingdom. Phone: (011) 44 1831 9252. Telex: (851) 262346.

Euan Rose, Beere Hobson Assoc., 34 Warwick Rd., Kenilworth, Warwickshire, CV8 1HE, United Kingdom. Phone: (0926) 512424. Telex: (851) 311951 (BEEHOB). (Representatives for CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350. (COMW D).

Advertisers Index

Agile ... 29
Aim Technology ... 114
Application Development Systems ... 13
Applied Management ... 13
Artificial Intelligence ... 99
AT&T Information Systems ... 26,96

Bell & Howell ... 112
BI Moyle ... 19
Britton-Lee ... 28,29
BRS Search ... 113

Cambex ... 78
Cambridge Systems ... 23
Candle Corp. ... 86,98
CGI Corp. ... 91
CMI Corp ... 62
Codex ... 47
Compaq ... 60-61
Computer Consoles ... 45
Computer Corp. of America ... 87,143
Computer Management Research ... 98
Computer Technology Group ... 55
Concurrent Computer ... 63
Cullinet ... 9
CW 1000th Issue ... 76
CW Circulation ... 138
CW IBM Extra ... 88
CW Mexico ... 115
CW Testimonial ... 123,124

Data Access ... 122
Data Design ... 109
Data General ... 59
Datasouth Computer ... 82
Datasphere ... 15
DataTool ... 111
D&B Computing Services ... 120-121
Duquesne ... 108

Elxsi ... 36
Electro Rep ... 55
Esprit ... 66

Gateway Micro Systems ... 28
Gould ... 58
Group Operations Inc. ... 117

Hayes Microcomputer ... 104
Help/38 Systems ... 75
Honeywell Information Systems ... 84-85

IBM ... 46
Infodata ... 100-101
Information Builders ... 22
Informix ... 106-107
InfraStructures ... 14
Innovation Data Processing ... 5
Integrated Network Ststems ... 34

Jacore ... 119
JD Edwards ... 21
JDS Microprocessing ... 15

Krueger ... 80

Leasametric ... 75
Leading Software Technologies ... 44
Lotus Development ... 43,72-73

McCormack & Dodge ... 83
Microcom ... 48
Michaels, Ross & Cole Ltd. ... 32
Motorola ... 50-51

Nastec ... 42
NCR Corp. ... 38-39
Nynex ... 90

On-Line Software International ... 105,116,117
Oracle Corp. ... 11,35

Qwikterm ... 64

Rapid Systems Development ... 33
RD Labs ... 78
Realia ... 110
Relational Technology ... 30

SAS Institute ... 24-25,27,95
Software AG ... 20
Software Products ... 101
Software Technology ... 12,64
Software Technology and Research (STAR) ... 12,115
Sorbus ... 97
Spectragraphics ... 103
Sperry Corp. ... 68-69
SPSS Inc. ... 74
SQ Software ... 92
Subject, Wills, & Co. ... 93
Syncsort, Inc. ... 3,18
Systems Center ... 81

Technology Transfer ... 89
Televideo ... 53,79
Telex ... 40
Texas Instruments ... 32-33
Travtech ... 12
Triangle Software ... 111
TSSI ... 36

Uccel ... 92-93
Unilease ... 37
Union Carbide ... 8
Unitech ... 10

VM Software ... 7

Walker Interactive ... 94
Wang ... 67
Westinghouse ... 118
Whitesmiths ... 70
Wyse Technology ... 71

Yourdon ... 102

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Burroughs posts $2.6B sales

First quarter as merged firm nets $52.9M profits

By Alan Alper

DETROIT — Turning in the first financial results since it acquired Sperry Corp. last month, Burroughs Corp. last week posted third-quarter earnings of $52.9 million on revenue of $2.6 billion.

Burroughs alone earned $32.2 million in the like period last year on revenue of $1.1 billion.

Burroughs declined to break out Sperry's contribution to third quarter results. Sperry earned $42.7 million on revenue of $1.3 billion from continuing operations in the third quarter last year. The firm, however, lost $187.9 million after taking a $220 million loss on the sale of its New Holland farm equipment division.

Commenting on the results, Burroughs Chairman W. Michael Blumenthal said that "strong international performance, helped by a weaker dollar, offset generally weak conditions in the U.S."

Blumenthal also noted that continuing operations at both Sperry and Burroughs showed "low double-digit growth" on a year-to-year comparative basis. "We are encouraged by the positive response we have received from the Sperry customer base," he added. "This is reflected by a substantially improved order flow this quarter and reverses the disappointing order level that Sperry experienced in the June quarter."

On the whole, Burroughs said, international business more than offset a relatively flat showing in the U.S. Strong worldwide order growth in commercial products offset a decline in the defense business, the firm added.

Slide persists Apollo, Sun up

From page 142

of looking at what the market required and hitting it right," noted Hank Kellog, an analyst at The Yankee Group in Boston. "They realized they needed a low-cost workstation and faced up to the fact that their own operating system was no longer acceptable and needed hooks into IBM."

International business, which comprises a little less than half of Apollo's revenues, remained strong, Newton said, adding that the trend in domestic orders is encouraging.

• **Sun Microsystems.** Revenue for the firm's first fiscal quarter, ended Sept. 26, increased 172% to $91.6 million, while profits soared 570% to $6.7 million.

"We believe the strong results reflect further industry endorsement of our open systems philosophy of distributed computing," said Sun's Chief Financial Officer Robert G. Smith.

The Yankee Group's Kellog agreed. "Sun has argued all along for an open systems approach by using standards like Unix and the Motorola, Inc. 68020," he said.

• **Amdahl Corp.** The Sunnyvale, Calif., IBM-compatible mainframe vendor posted third-quarter earnings of $7.1 million, up 25% from the same period last year, although revenue remained flat at $220 million.

Louis Giglio, a market research analyst at Bear Stearns, Inc., said Amdahl was hurt by delays in shipping its IBM 3090-compatible CPU, the 5890.

• **Honeywell, Inc.** Citing ongoing weakness in the U.S. computer and industrial markets, the Minneapolis mainframe maker reported third-quarter profits of $32.4 million, down 42% from the like period last year. Revenue increased 6% to $1.66 billion in the quarter.

Third-quarter earnings included a $6.4 million charge associated with a reduction of jobs in the company's computer and controls operations in Phoenix, Honeywell said.

Honeywell Chairman and CEO Edson Spencer said operating profit in the Information Systems Group was down sharply, although the firm does not quantify quarterly results for its individual groups.

Total orders for the company increased in the third quarter, Spencer said, noting that computer orders increased in both the U.S. and international markets.

• **NCR.** Continuing to buck the mainframe industry trend, NCR reported revenue increased 13% to $1.17 billion, although third-quarter earnings of $73.3 million were up just 2% from the year-earlier period.

Chairman Charles Exley Jr. said that while he was disappointed that third-quarter results were slightly below expectations, he was happy that the firm posted an increase in both profit and revenue.

Bear Stearns' Giglio, like other analysts, continues to be concerned about NCR's personal computer business despite recent order increases. "They're still not profitable in PCs and have one of the highest costs of manufacturing because their products are built in Germany," he said.

"They should get out of the retail and the low end of the business and contract out manufacturing."

• **Apple.** Completing its reversal of fortune, the microcomputer firm posted fiscal 1986 earnings of $153.9 million, up 151% from last year, on flat revenue of $1.9 billion.

The Cupertino, Calif., firm posted fourth-quarter profits of $32.8 million, up 47% from the year-earlier period on a revenue increase of 25% to $510.7 million.

Analysts attributed the improved results to tighter fiscal controls and increased demand for the Macintosh and Apple II product lines.

Chairman and Chief Executive John Sculley said that during the fourth quarter, Apple's Macintosh and Apple II gained momentum in the business and educational markets, respectively.

Apple's improved performance in the business market is the result of its niche strategy, noted Tom Galvin, an analyst with Shearson Lehman Brothers, Inc. in New York, positioning Macintosh and its laser printer as a desktop publishing solution.

Televideo, Tandon gamble on AT-compatible market

ACTIVE ISSUES
Kathy Porteus

Tandon Corp. (TCOR — 2¼) and Televideo Systems, Inc. (TELV — 2½) have much in common these days.

Both companies are attempting to penetrate the intensely competitive market for IBM Personal Computer AT-compatible computers. Both have suffered sizable losses in their traditional core businesses — disk drives and ASCII terminals, respectively. And both are issues selling at less than $3 per share, compared with three years ago when both were trading in the $30 to $40 range.

Analysts give each company a 50-50 chance of successfully making the transition to computer systems supplier. Nevertheless, such a combination of shaky financials and an uncertain future attracts investors who are willing to bear a high level of risk to see such turnaround stories end happily.

"Tandon had a good strategy for becoming a systems manufacturer," says James Stone, analyst with Shearson, Lehman Brothers, Inc., "but this strategy has proven more difficult to implement than had been originally anticipated."

Steven Ossad, of L. F. Rothschild, Unterberg Towbin, says Tandon has signed on slightly more than 600 retail dealers, but that it expected to have roughly 1,000 by this time. "In anticipation of a higher level of sales," Ossad says, "Tandon probably overbuilt," causing a financial squeeze and layoffs.

For the fiscal year ended Sept. 30, Ossad estimates Tandon will report revenue of $205 million to $210 million and lose 55 cents per share on operations and that the firm may write off more than the costs related to closing a disk drive facility.

Tandon's retail efforts suffered a setback recently because of the departure of its highly visible director of sales and marketing, former IBM veteran H. L. "Sparky" Sparks, who resigned for personal reasons. While Sparks' resignation may initially slow Tandon's retail strategy, it should not represent a serious challenge to Tandon's existing dealer structure, analysts say.

The company also continues pursuing its OEM systems business, having already pocketed agreements with Tandem Computers, Inc., Xerox Corp. and Siemens AG.

Tandon's recent reorganization, separating its disk drive and computer systems operations, caused speculation that the company may intend to sell its battle-worn peripherals business to help raise needed cash. According to Shearson's Stone, however, Tandon will not likely abandon a few drive models that are crucial to its personal computer strategy.

According to Rothschild's Ossad, the upcoming holiday selling season is particularly important for Tandon, because a good showing could facilitate signing on more dealers as well as boost investor confidence in the company's turnaround. "If word starts spreading that Tandon is selling retail PCs better than people think, you'll quickly see a $6 stock," Ossad says.

Whereas news of a good Christmas may cause Tandon's stock to jump, Televideo shares will not move significantly until the company shows sustainable profitability, according to Samuel Navarro, director of technology research for Ladenburg, Thalmann & Co. of New York.

For the fiscal year ending Oct. 31, Navarro estimates Televideo will earn about $500,000, compared with a $19 million loss last year. "I think there is a 50-50 chance Televideo will have a very good 1987," Navarro says, "which means earning $11 to $12 million after taxes, or about 25 cents per share."

Unlike Tandon, which has focused entirely on systems, Televideo is trying to regain a leading position in the ASCII terminal market.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Floating Point exec resigns

By Ninamary Buba Maginnis

BEAVERTON, Ore. — Amidst reports of another poor quarter, Floating Point Systems, Inc. announced a change of command last week.

Lloyd D. Turner resigned as president, chief executive officer and director. He will be retained as consultant for the T Series computer. "I was a little surprised it didn't happen sooner," said Gary Smaby, an analyst with Minneapolis-based Piper, Jaffray & Hopwood, of Turner's resignation.

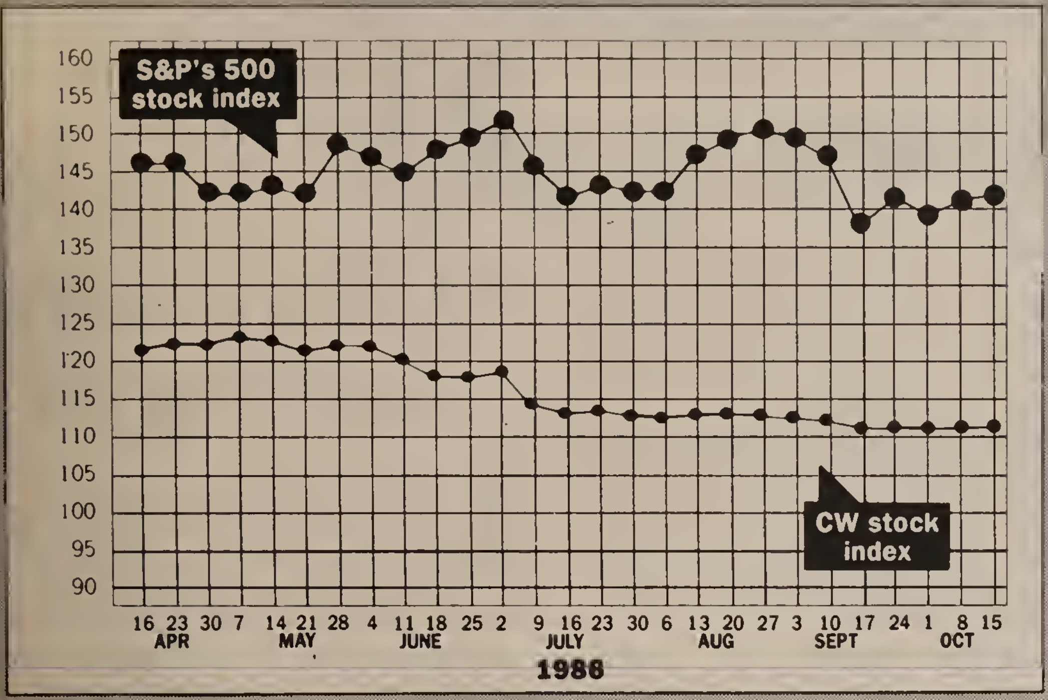
Milton R. Smith, board member and general counsel, was voted interim chairman and chief executive officer. George P. O'Leary, a former vice-president and director, will serve as president, chief operating officer and director. Chairman C. N. Winningstad will serve as vice-chairman.

The firm also said it expects its fourth-quarter operating loss to exceed its $3.9 million third-quarter operating loss.

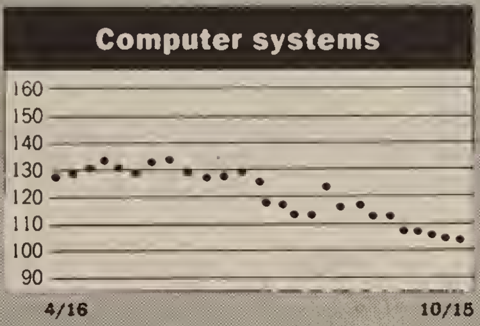
Floating Point is also in the throes of transition, changing from an OEM organization to an end-user firm, Smaby said. The loss of a major contract with General Electric Co. spurred the metamorphosis, he said.

MITCHELL J. HAYES

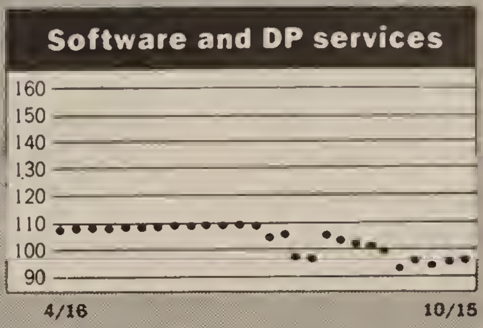
Computerworld stock trading index



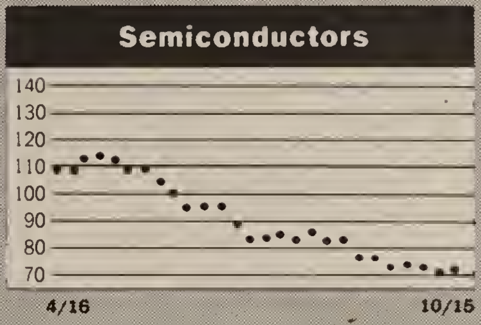
Computer systems



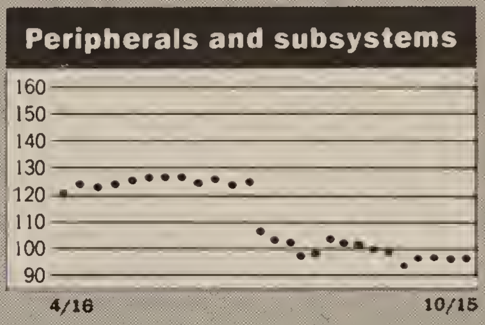
Software and DP services



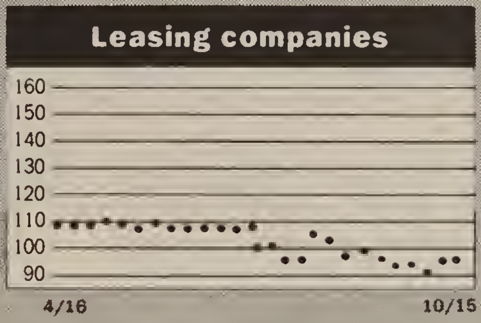
Semiconductors



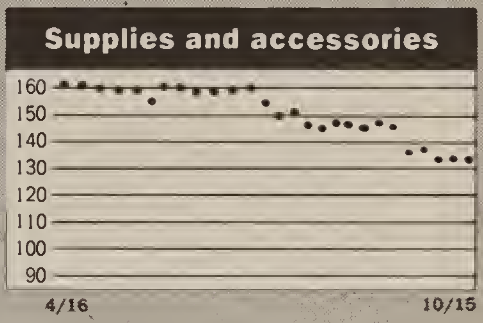
Peripherals and subsystems



Leasing companies



Supplies and accessories



All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	10/8/86	10/15/86
Computer systems	106.3	**105.5**
Software and DP services	95.1	**96.4**
Peripherals and subsystems	96.4	**97.2**
Supplies and accessories	131.5	**131.3**
Semiconductors	70.5	**71.2**
Leasing companies	95.7	**96.1**
CW stock index	111.3	**111.4**
Standard and Poor's 500 stock index	141.5	**142.8**

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, OCTOBER 15, 1986

COMPUTER SYSTEMS

EXCH		PRICE				
		52-WEEK RANGE (1)		CLOSE OCT 15 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	6.75	+0.2	+2.8
O	ALTOS COMPUTER SYS	19	10	10.50	-0.1	-1.2
A	AMDAHL CORP	22	10	19.25	-0.8	-3.8
O	APOLLO COMPUTER INC	18	9	13.63	-0.1	-0.9
O	APPLE COMPUTER INC	39	17	33.38	+0.6	+1.9
N	AT&T	26	20	24.75	+1.6	+7.0
N	BURROUGHS CORP	76	54	69.25	+0.1	+0.2
O	C P T CORP	7	4	3.75	+0.1	+3.4
N	COMPAQ COMPUTER CORP	18	10	15.50	+0.4	+2.5
A	COMPUTER CONSOLES INC	12	6	7.50	-0.1	-1.6
O	CONCURRENT COMP CORP	25	1	14.50	+0.3	+1.8
N	CONTROL DATA CORP DEL	29	16	24.88	-1.0	-3.9
O	CONVERGENT TECH	14	5	5.00	-0.4	-7.0
N	CRAY RESH INC	100	50	77.75	-0.6	-0.8
O	DAISY SYS CORP	32	8	8.00	+0.1	+1.6
N	DATA GEN CORP	50	27	27.88	-0.1	-0.4
N	DATAPOINT CORP	9	5	8.25	+0.5	+6.5
N	DIGITAL EQUIP CORP	105	53	94.00	+2.0	+2.2
N	ELECTRONIC ASSOC INC	7	4	4.25	-0.9	-17.1
N	FLOATING POINT SYS INC	46	12	11.50	-0.6	-5.2
N	GOULD INC	35	15	20.00	-0.4	-1.8
N	HARRIS CORP DEL	36	24	28.00	-0.6	-2.2
N	HEWLETT PACKARD CO	50	29	38.50	+0.3	+0.7
N	HONEYWELL INC	87	59	68.13	-2.1	-3.0
N	IBM	162	120	123.00	-4.5	-3.5
O	IPL SYS INC	4	1	2.25	+0.0	+0.0
N	ITT CORP	60	33	52.13	-0.1	-0.2
N	M A COM INC	19	13	14.38	-0.1	-0.9
N	MATSUSHITA ELEC INDL LTD	118	55	108.00	-6.8	-5.9
O	MENTOR GRAPHICS CORP	21	11	14.50	+0.1	+0.9
N	MOHAWK DATA SCI CORP	4	1	2.63	+0.1	+5.0
N	NBI INC	14	9	9.38	+0.1	+1.4
N	NCR CORP	57	34	43.63	-2.1	-4.6
N	PRIME COMPUTER INC	28	16	17.75	+0.5	+2.9
N	SPERRY CORP	77	46	75.75	+0.0	+0.0
O	STRATUS COMPUTER	26	17	19.25	-0.3	-1.3
O	SYMBOLICS INC	16	5	5.00	-0.4	-7.0
O	TANDEM COMPUTERS INC	40	15	36.50	+1.3	+3.5
N	TANDY CORP	45	31	34.25	+1.0	+3.0
N	TEXAS INSTRS INC	148	88	112.00	+0.3	+0.2
A	ULTIMATE CORP	35	12	13.50	-1.0	-6.9
A	WANG LABS INC - B	23	12	12.00	-0.4	-3.0
A	WANG LABS INC - C	23	11	11.88	-0.5	-4.0
N	XEROX CORP	72	47	56.00	+2.4	+4.4

SUPPLIES & ACCESSORIES

EXCH		52-WEEK RANGE (1)		CLOSE OCT 15 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	25	27.00	+1.0	+3.8
N	BARRY WRIGHT CORP	25	15	15.63	-0.5	-3.1
A	DUPLEX PRODS INC	23	18	19.13	-0.9	-4.4
N	ENNIS BUSINESS FORMS INC	28	18	23.00	-0.8	-3.2
N	3M CO	116	77	107.25	+6.5	+6.5
N	MOORE LTD	28	18	20.50	-0.1	-0.6
O	STANDARD REGISTER CO	50	32	33.25	+0.5	+1.5
N	WALLACE COMPUTER SVCS	50	35	38.50	-1.4	-3.4

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & DP SERVICES

EXCH		PRICE				
		52-WEEK RANGE (1)		CLOSE OCT 15 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	4	5.00	+0.0	+0.0
N	ADVANCED SYS INC	19	12	13.75	+0.9	+6.8
N	AGS COMPUTERS INC	25	14	18.38	+0.1	+0.7
O	AMERICAN MGMT SYS INC	20	10	15.00	+0.0	+0.0
O	AMERICAN SOFTWARE INC	15	9	13.13	+0.4	+2.9
N	ANACOMP INC	7	3	3.88	-0.4	-8.8
O	ANALYSTS INTL CORP	10	4	5.63	+0.2	+3.4
O	ASHTON TATE	34	10	30.75	+0.4	+1.2
O	ASK COMPUTER SYS INC	15	9	11.38	+0.9	+8.3
O	ASTRADYNE COMP IND	3	1	1.81	+0.0	+0.0
N	AUTOMATIC DATA PROC	39	25	36.50	+1.8	+5.0
O	COMPUTER ASSOC INTL INC	25	11	22.75	+0.0	+0.0
O	COMPUTER HORIZONS CORP	15	10	10.75	-0.3	-2.3
O	COMPUTER NETWORK TECH	10	2	4.81	+0.0	+0.0
N	COMPUTER SCIENCES CORP	40	25	33.75	+2.8	+8.9
O	COMPUTER TASK GROUP INC	19	11	13.88	+0.4	+2.8
O	COMPUTONE SYS INC	6	1	0.75	-0.2	-20.0
O	COMSHARE INC	16	9	11.75	-0.8	-6.0
N	CULLINET SOFTWARE INC	20	6	6.50	+0.0	+0.0
O	CYCARE SYS INC	17	9	9.13	+0.0	+0.0
O	DUQUESNE SYS INC	33	12	29.50	-1.3	-4.1
N	GENERAL ELEC CO	83	58	76.88	+3.4	+4.6
N	GENERAL MTRS CORP	50	30	33.75	+0.4	+1.1
N	GTE CORP	60	39	57.00	+0.8	+1.3
O	HOGAN SYS INC	12	5	10.88	+0.1	+1.2
O	INFORMATION SCIENCES INC	4	1	1.63	+0.0	+0.0
O	INFOTRON SYS CORP	19	8	8.75	+0.3	+2.9
O	KEANE INC	16	6	6.25	-0.5	-7.4
N	LOGICON INC	43	24	27.00	-0.1	-0.5
O	LOTUS DEV CORP	44	17	44.00	+0.8	+1.7
O	MANAGEMENT SCI AMER	16	9	12.00	+0.3	+2.1
O	MCI COMM CORP	13	7	7.25	-0.3	-3.3
O	MICOM SYS INC	23	10	12.50	+2.4	+23.5
O	MICRO PRO INTL CORP	4	2	2.13	+0.0	+0.0
O	MICROSOFT CORP	36	26	35.00	+3.0	+9.4
O	NATIONAL DATA CORP	26	14	21.25	+1.5	+7.6
O	ON LINE SOFTWARE INT	16	6	10.50	-0.3	-2.3
O	ORACLE SYS CORP	29	13	18.00	+0.8	+4.3
N	PANSOPHIC SYS INC	36	21	28.75	+0.1	+0.4
N	PLANNING RESH CORP	24	14	20.88	+0.1	+0.6
O	POLICY MGMT SYS CORP	24	15	18.25	+2.5	+15.9
O	PROGRAMMING & SYS INC	11	5	8.50	+0.0	+0.0
O	REYNOLDS & REYNOLDS CO	42	19	34.38	-0.6	-1.8
O	SCIENTIFIC COMPUTERS INC	6	4	4.44	+0.2	+4.4
O	SEI CORP	28	15	19.50	+1.3	+6.8
O	SHARED MED SYS CORP	41	29	35.25	+1.9	+5.6
O	SOFTWARE AG SYSTEMS INC	22	13	15.25	-0.3	-1.6
O	SOFTWARE PUBG CORP	10	5	5.38	-0.1	-2.3
A	STERLING SOFTWARE INC	21	8	15.00	+0.0	+0.0
N	UCCEL CORP	24	13	23.13	+0.4	+1.6
N	URS CORP	18	10	15.13	+0.0	+0.0
O	VM SOFTWARE INC	32	17	28.25	+0.3	+0.9

SEMICONDUCTORS

EXCH		52-WEEK RANGE (1)		CLOSE OCT 15 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	14.75	+1.0	+7.3
N	ANALOG DEVICES INC	25	15	16.38	+0.0	+0.0
O	ANALOGIC CORP	16	10	10.75	+0.0	+0.0
N	APPLIED MAGNETICS CORP	20	12	14.00	+0.5	+3.7
O	AVANTEK INC	24	15	15.50	-0.5	-3.1
O	HADCO CORP	7	3	4.00	+0.3	+6.7
O	INTEL CORP	32	16	19.25	+0.8	+4.1
O	MICRO MASK INC	7	2	2.88	-0.3	-8.0
N	MOTOROLA INC	50	31	35.38	-0.3	-0.7
N	NATIONAL SEMICONDUCTOR	16	8	9.50	+0.3	+2.7
N	TERADYNE INC	30	16	16.38	-0.3	-1.5

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE				
		52-WEEK RANGE (1)		CLOSE OCT 15 1986	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	4	5.75	+0.5	+9.5
A	ANDERSON JACOBSON INC	3	2	1.94	+0.2	+10.7
O	AST RESH INC	33	11	11.75	-0.8	-6.0
O	AUTOTROL CORP	10	6	6.75	+0.1	+1.9
O	AVANT GARDE COMPUTING	8	3	4.25	-0.9	-17.1
O	BANCTEC INC	13	6	8.38	+0.1	+1.5
N	BOLT BERANEK & NEWMAN	48	30	42.00	+0.8	+1.8
N	CENTRONICS DATA COMP	8	4	7.00	-0.4	-5.1
A	CETEC CORP	9	5	5.50	-0.3	-5.4
A	COGNITRONICS CORP	6	3	2.50	-0.4	-13.0
N	COMPUGRAPHIC CORP	29	16	19.63	-0.4	-1.9
N	COMPUTERVISION CORP	19	9	14.38	+1.6	+12.7
N	CONRAC CORP	18	12	14.25	+0.0	+0.0
A	DATAPRODUCTS CORP	18	12	13.63	+0.4	+2.8
A	DATARAM CORP	18	6	7.88	-0.3	-3.1
O	DATA SWITCH CORP	9	5	5.38	-0.1	-2.3
O	DATUM INC	7	5	4.88	+0.1	+2.6
N	DECISION INDS CORP	15	8	9.25	-0.4	-3.9
O	ENDATA INC	8	3	6.00	-0.1	-2.0
O	EVANS & SUTHERLAND	27	18	22.50	+1.5	+7.1
N	FLOATING POINT SYS INC	46	12	11.50	-0.6	-5.2
O	GANDALF TECHNOLOGIES	8	5	5.88	+0.1	+2.2
N	GENERAL DATACOMM IND	15	8	9.25	+0.3	+2.8
N	HAZELTINE CORP	27	16	21.50	+0.6	+3.0
O	ICOT CORP	13	7	9.25	+0.0	+0.0
O	INFORMATION INTL INC	18	10	13.75	-0.4	-2.7
O	INTECOM INC	7	3	5.31	+0.0	+0.0
O	INTERLEAF INC	15	8	8.50	-0.5	-5.6
O	MEGADATA CORP	5	2	2.25	-0.1	-5.3
A	MSI DATA CORP	14	8	12.25	+0.9	+7.7
N	NASHUA CORP	28	12	23.88	-0.5	-2.1
O	NETWORK SYS CORP	25	10	12.63	+0.6	+5.2
N	NORTH AMERN PHILIPS CORP	48	32	38.88	+1.3	+3.3
N	NORTHERN TELECOM LTD	38	25	29.13	+0.9	+3.1
O	NOVELL INC	24	12	19.50	-0.3	-1.3
O	OMEX	1	0	0.38	+0.0	+0.0
N	PARADYNE CORP	11	5	5.50	+0.0	+0.0
A	PENRIL CORP	9	5	5.75	+0.4	+7.0
N	PLESSEY PLC	38	19	26.00	+1.0	+4.0
O	PRINTRONIX INC	15	11	12.25	+0.4	+3.2
O	QMS INC	16	6	13.00	+0.1	+1.0
O	RAMTEK CORP	7	2	4.63	+0.5	+12.1
N	RECOGNITION EQUIP INC	17	9	12.13	+0.4	+3.2
N	SANDERS ASSOC INC	63	29	59.88	+0.0	+0.0
O	SCAN TRON CORP	19	10	16.00	+0.9	+5.8
N	SCIENTIFIC ATLANTA INC	15	9	8.88	+0.0	+0.0
O	SEAGATE TECHNOLOGY	18	5	17.88	+2.0	+12.6
N	STORAGE TECHNOLOGY	7	1	2.13	+0.0	+0.0
O	SUN MICROSYSTEM INC	20	11	15.63	+0.5	+3.3
A	T-BAR INC	7	5	5.50	+0.0	+0.0
A	TAB PRODS CO	15	10	13.25	+0.3	+1.9
O	TANDON CORP	8	2	2.25	-0.3	-10.0
A	TEC INC	8	4	4.50	+0.0	+0.0
N	TEKTRONIX INC	65	50	62.38	+1.5	+2.5
O	TELEVIDEO SYS INC	4	2	2.50	+0.1	+5.3
N	TELEX CORP	69	44	56.75	-1.4	-2.4
N	TIMEPLEX INC	24	14	18.50	+3.0	+19.4
N	TITAN CORP	12	6	7.00	-0.5	-6.7
O	VISUAL TECHNOLOGY INC	1	0	0.63	-0.1	-9.2
O	WYSE TECH	19	9	13.63	+0.4	+2.8

LEASING COMPANIES

EXCH		52-WEEK RANGE (1)		CLOSE OCT 15 1986	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	12	16.00	-0.5	-3.0
N	CONTINENTAL INFO SYS	12	5	8.88	+0.3	+2.9
O	FINALCO GROUP INC	5	3	3.38	+0.0	+0.0
O	PHOENIX AMERN INC	6	2	4.63	+0.3	+5.7
O	SELECTERM INC	12	5	6.13	-0.4	-5.8
N	U.S. LEASING	46	32	42.50	+1.0	+2.4

COMPUTER INDUSTRY

INSIDE

Convergent Technologies founder Allen Michels discusses his 'personal supercomputer' start-up firm, The Dana Group/**115**

AT&T is seen backing off its push into the computer industry/**118**

MSA reports a 25% sales increase for the quarter/**119**

Merged Burroughs-Sperry revenue hits $2.6 billion in third quarter/**140**

INSTANT ANALYSIS

"Our industry focus is showing good results, particularly in financial services, where we have won significant new business."

— Kenneth H. Olsen, president, Digital Equipment Corp.

Mainframe slide persists; Apollo, Sun post gains

By Alan Alper

While mainframe vendors continue to suffer the negative effects of the 2-year-old computer industry slump, engineering workstation vendors appear to be enjoying a business boom, according to third-quarter financial results released last week.

Apollo Computer, Inc. and Sun Microsystems, Inc. posted robust results, despite strong incursions made into the engineering workstation market by Digital Equipment Corp. and, to a lesser degree, IBM. Decreased third-quarter profits at Honeywell, Inc. and flat revenue at Amdahl Corp. reflected continuing difficulties within the mainframe market, analysts said.

NCR Corp., which offers a more diversified computer product line, remains the exception among the traditional mainframe companies. NCR's revenue and profits climbed in the third quarter, although not at expected rates because of a moderated growth rate in overseas business.

Meanwhile, Apple Computer, Inc. showed strong financial gains, reflecting inroads made into the office environment and continued strength in the education market.

- **Apollo.** The Chelmsford, Mass.-based engineering workstation vendor reported third-quarter revenue of $100 million, up 82% from the year-earlier period. Net income was $2.46 million, compared with an $18.4 million loss reported in the like period last year.

Apollo Vice-President and Treasurer John H. Newton pointed to the response to the firm's new Domain Series 3000 personal workstation and an almost doubling of its installed base to 27,000 as reasons for the firm's dramatic turnaround. The company also increased corporate accounts by 700 to 1,700, he said.

"Apollo's rejuvenation is a result

See **SLIDE** page 140

NAS says OEM deal still solid

Claims Hitachi's U.S. plans won't alter pact

By Clinton Wilder

MOUNTAIN VIEW, Calif. — Officials of National Advanced Systems Corp. (NAS) and the U.S. subsidiary of Hitachi Ltd. last week insisted that Hitachi's U.S.-based manufacturing operation does not jeopardize NAS's long-standing OEM agreement to sell Hitachi mainframes.

"I don't see how a change in Hitachi's manufacturing strategy begets a change in their marketing strategy," said David Turner, vice-president and general manager of product operations for NAS.

"Fujitsu America, Inc. has been doing for years in the U.S. what Hitachi is just starting to do, but no one talks about the Fujitsu-Amdahl Corp. relationship disappearing," Turner added.

Japan-based sources within Hitachi said recently that the Japanese electronics giant is considering the sale of Hitachi-labeled mainframes in the U.S. [CW, Oct. 13].

Private-label mainframes

Currently, Hitachi mainframes in the U.S. are all privately labeled by NAS. Last year, Hitachi opened its first U.S.-based production plant in Norman, Okla.

Yasushi Sayama, deputy general manager for Hitachi America Ltd., said the firm currently plans to make only large 5G-byte disk drives at the Oklahoma facility. He said Hitachi has formed a group to consider the feasibility of building low-end workstation products there but that the firm has no plans to make mainframe processors in the U.S.

"Our relationship with Hitachi has never been better," NAS's Turner added.

INDUSTRY INSIGHT
Bob Djurdjevic

MVS/XA deals catching on

IBM's 1986 MVS/XA conversion sweetener, nicknamed the XA Express, seems to be producing results. In the last six months, IBM has signed up almost 2,000 additional MVS/XA licenses. That's a 59% growth on an annual basis. As of September 1986, MVS/XA accounts for an estimated one-third of IBM's OS-type licenses, up from about 25% six months before and only 10% in March 1985.

The XA Express is primarily aimed at the DOS and VM installed base. IBM's offer to these customers includes eight months of free MVS/XA use plus an additional 12 months of half-price charges. Considering the large size of the DOS installed base, with about 2,000 licenses worldwide, it is conceivable that a significant percentage of the 2,000 new MVS/XA licenses may have originated from the DOS world.

That's exactly the type of marketing program envisioned last February, when it appeared that IBM was likely to sweeten the pot for its users through some special marketing programs. One-time discounts help speed up conversion to MVS/XA without jeopardizing IBM's long-term returns from it.

At the same time, however, IBM may increase the fees it charges for the older release of its operating system in order to bridge the gap between the older software and the XA products, thus making it easier to justify the

See **MVS/XA** page 116

Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm.

No end in sight for chip makers; Intel, AMD report losses

U.S. firms cut costs, hope to ride out slump

By James A. Martin

There was more bad news in the semiconductor industry recently as Intel Corp. and Advanced Micro Devices, Inc. (AMD) announced huge operating losses and another round of cost-cutting moves.

Although the firms attributed a large portion of those losses to earlier cutbacks and expressed guarded optimism for a stronger fourth quarter, the U.S. chip industry is seriously depressed and will remain so for some time to come, analysts said.

In addition to quarterly losses of $46.9 million and $114.2 million, respectively, Advanced Micro announced the elimination of 500 jobs, and Intel Corp. said it is discontinuing its bubble memory operations.

With even IBM, one of the semiconductor industry's largest customers, expected to continue to report sluggish sales and earnings, there is little hope for the chip industry to pick up, said Matt Crugnale, president of Crugnale & Associates, a Mountain View, Calif., consulting firm.

"The semiconductor industry has been spending more time looking at what used to happen instead of what is happening," Crugnale said.

Semiconductor billings for the three-month period ending in September rose slightly, however, according to the Semiconductor Industry Association.

"The industry will continue to improve in the next few months, but it is difficult to develop a strong climate in a slow high-tech capital spending environment," said analyst Edward C. White of E. F. Hutton & Co.

Intel's net loss of $114.2 million for the third quarter compared with a net loss of $3.6 million in the same quarter last year. The Santa Clara, Calif., chip vendor said revenue was $324 million, compared with $312 million last year.

Intel's net losses were higher than those in the 1985 quarter due to the creation of a $60 million reserve designed to cover the costs of phasing out the company's bubble memory operations. The reserve will also finance the previously announced closing of Intel's Barbados production plant and the layoff of approximately 1,320 employees, according to the company.

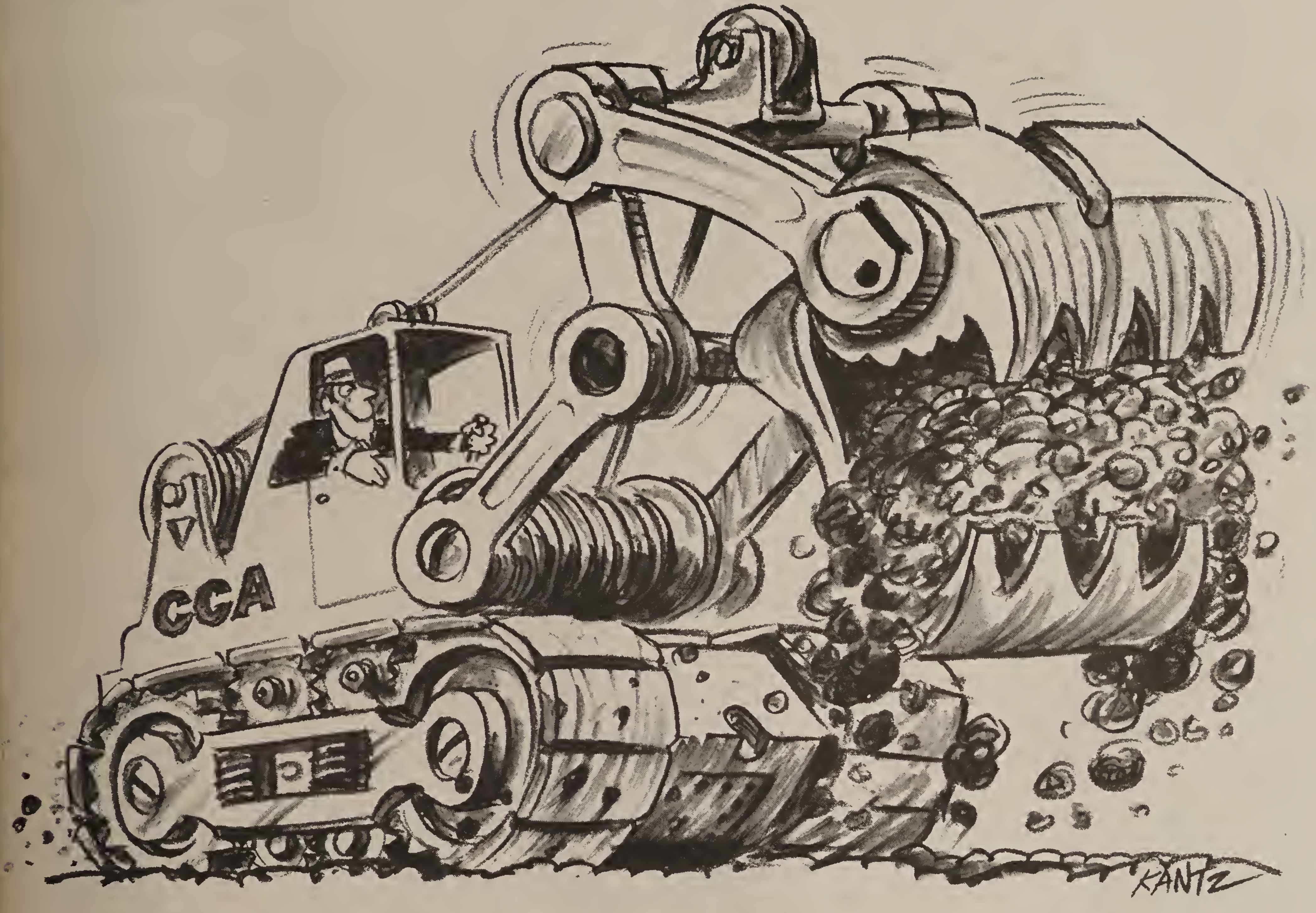
While analysts agreed that Intel has made the necessary cutbacks and should soon experience slight improvements, they were not as optimistic about Sunnyvale, Calif.-based AMD.

"Advanced Micro tends to be much more dependent on the minicomputer and mainframe manufacturers, and their orders have been flat on a sequential basis while their cost structure has been quite high," White said.

AMD reported a $46.9 million net loss for its second quarter, compared with a year-earlier loss of $15.3 million. Sales were $157.7 million, up from $128.1 million.

As expected, the company laid off 500 employees, its first staff reduction in 10 years. Depending upon industry performance, additional layoffs could be forthcoming, observers said.

When you're trying to bury the competition, who gives you the tools?



Computer Corporation of America.

Think of computer software as today's tools to help your firm outperform the competition.

At CCA we're providing business with a vast array of highly productive software tools. Tools that are making the available information work harder and smarter than ever before possible.

Starting with Model 204, a database management system that is more flexible than any other, and stores more than any other.

With Model 204, businesses are designing unique applications programs to give them the edge in their marketplace. To dig into the facts and spot trends before they become obvious. To track sales and see just where effort is needed. Or even new products.

And with Model 204, CCA offers a complete line of software innovations that handle information in every form. And every form includes not only traditional data, but even pictures and text can now be stored and retrieved from your database.

Research is a part of our investment to maintain leadership in software development and state-of-the-art systems. Our commitment includes a department of PhDs, researchers and systems scientists.

Plus more than 100 database developers and designers.

And their work is paying off. In products that let you make the most of data. With productivity tools that network everything together and make computers useable even for the "nontechnical."

Computer Corporation of America. A firm that's doing everything possible to make information a strategic weapon in business.

For more information, just send the coupon. Or, call John Donnelly at 1-800-258-4100, ext. 703.

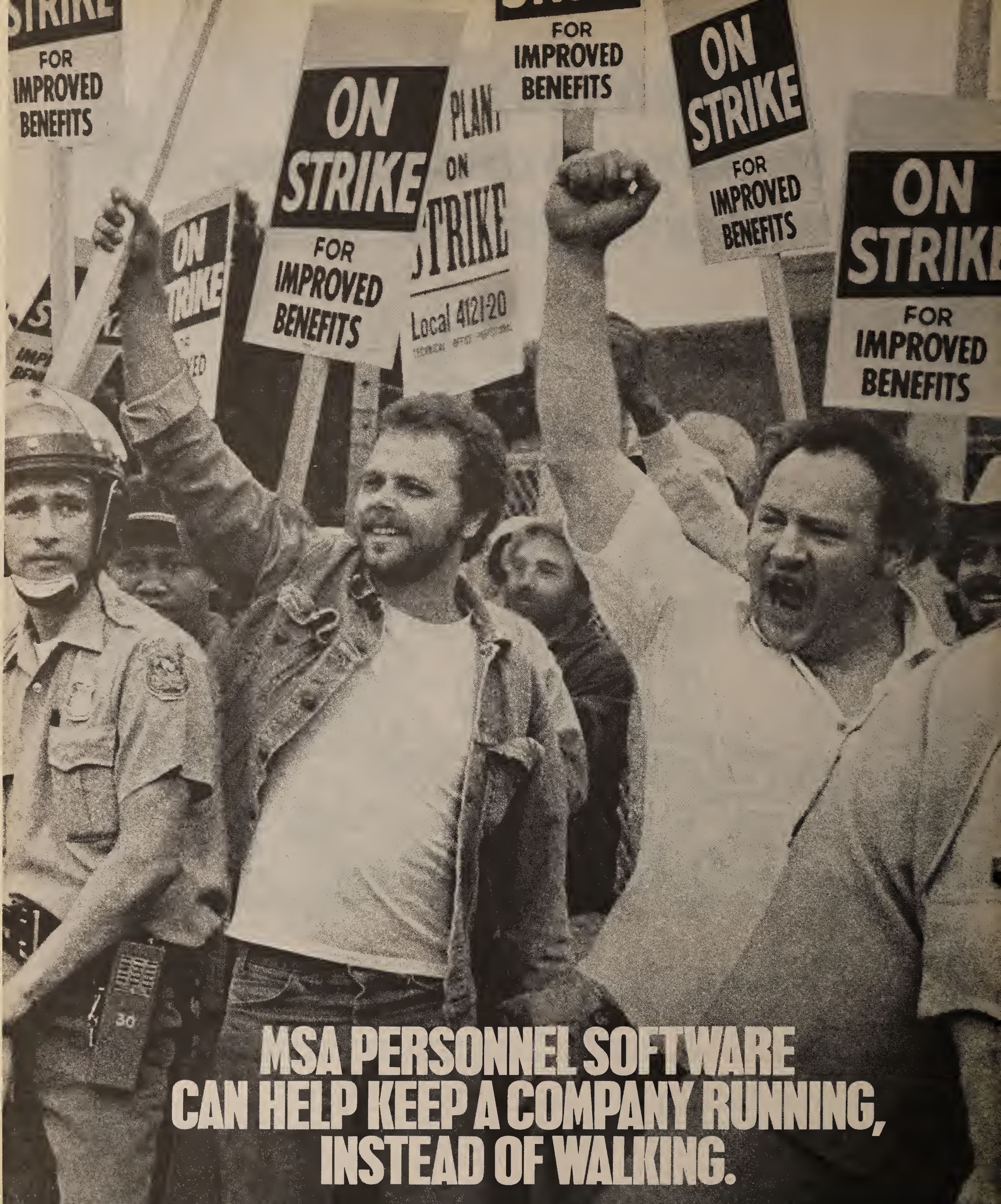
Please send me the scoop on how CCA can help me bury the competition.
Mail to: Four Cambridge Center, Cambridge, MA 02142.

Name ____________________
Company ____________________
Title ____________ Telephone ____________
Address ____________________
City ____________ State ____________ Zip ________

Computer Corporation of America
A Crowntek Company

CW

New Dimensions in Software Productivity.



Now your computer can tell you any problem your employees have before they do. Because Management Science America, Inc. has developed a personnel software system that lets you take care of their problem before they decide to take care of it themselves.

Besides tracking your workers' time, attendance, and seniority, the system monitors grievances, disciplinary actions, and problems reported by each of your employees.

It even helps you strike a cost effective agreement with a union, before a union can threaten a costly strike against you.

And besides helping company management talk to labor, our software will help your software packages talk to one another. With INFORMATION EXPERT.™ It's a system that integrates all of your software using a language you already know. English.

But before you can open lines of communication within your company, you have to open them u with us. Call Robert Carpenter at 404-239-2000.

After all, who would you rather talk to, a software expert or a labor negotiato

MSA SOFTWARE
INTELLIGENCE OF A HIGHER ORDER.™

© 1986 Management Science America, Inc.